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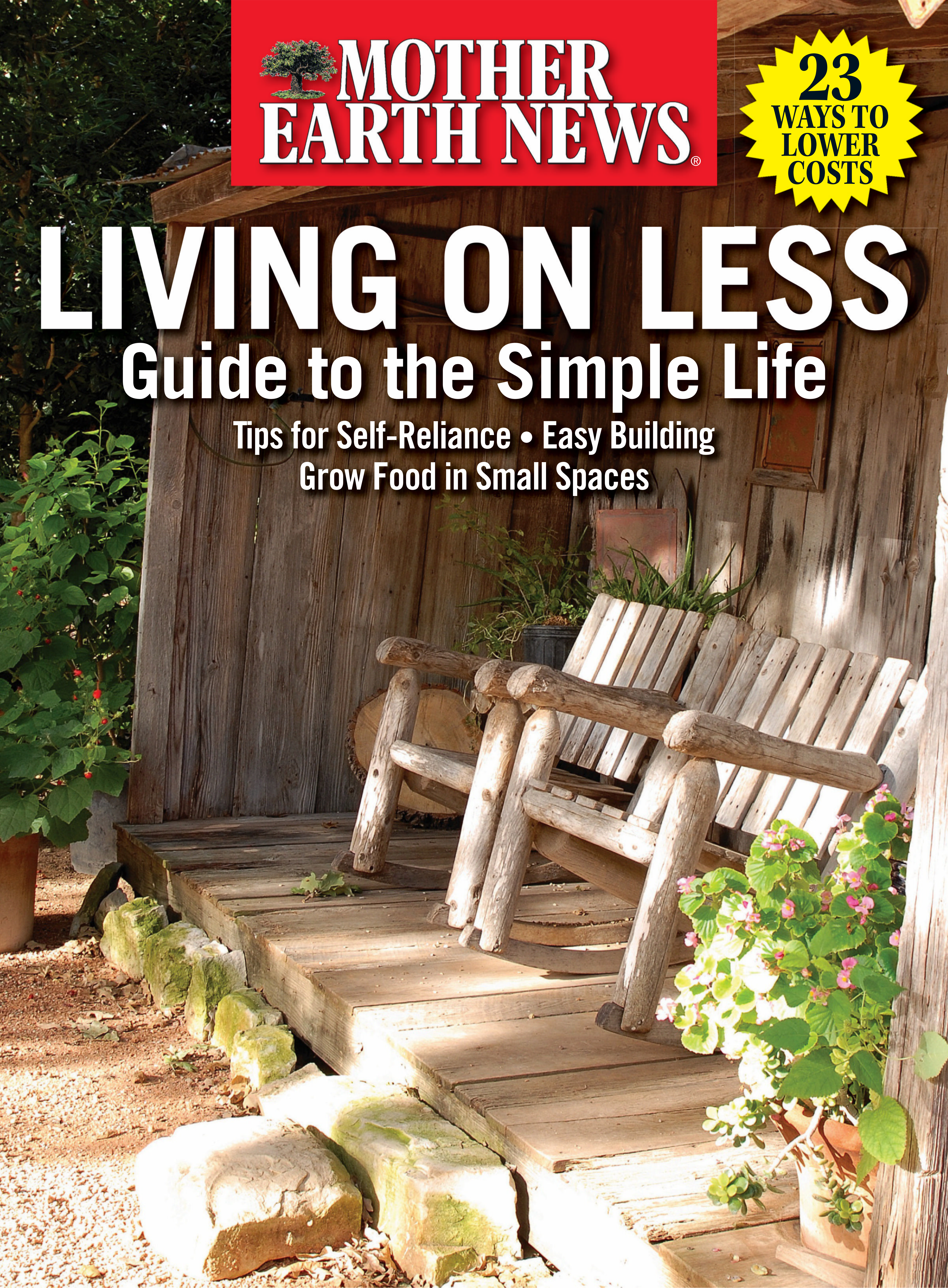
Grow Food in Small Spaces



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THE ORIGINAL GUIDE TO LIVING WISELY

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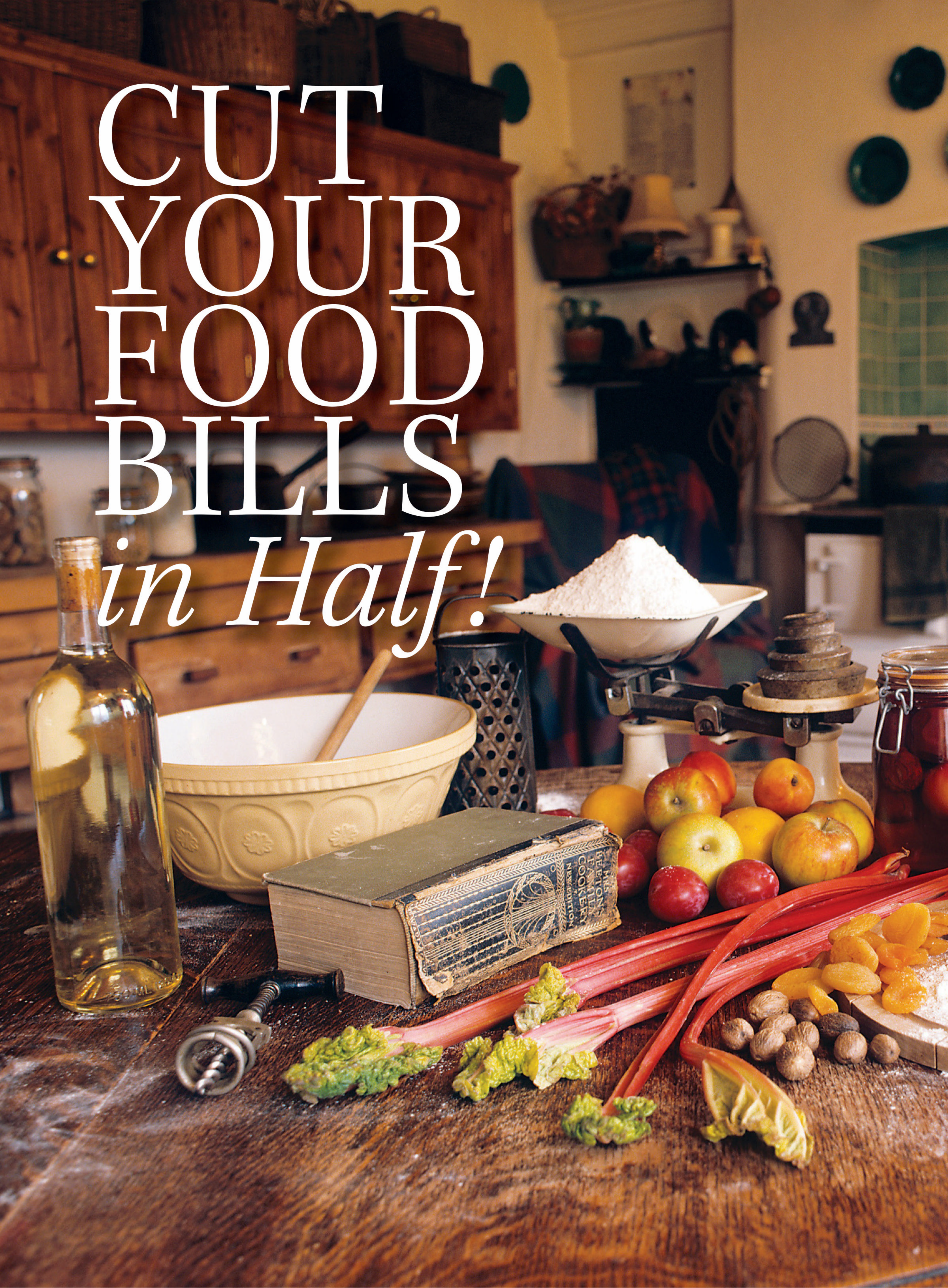

It’s true! You can enjoy more healthful food while spending much less to feed your family.

By Barbara Pleasant

Everybody eats, and what we eat is getting more expensive all the time. In December 2022, the U.S. Department of Agriculture calculated an average food cost for a family of two at just less than $1,000 a month. Can you really cut that in half? You bet you can. And in the process you will also improve the overall quality and security of your food supply.

It should come as no surprise that cooking at home is a huge step in the right direction, and it may require less time than you think. Growing some of your own food is a big help, too, whether you are gardening at home or investing some volunteer time in a community garden, school garden or CSA program (community-supported agriculture, a system in which members receive produce directly from a farm). But first there is another matter to address, which most people find about as pleasurable as stepping on the scale. You must take an honest look at where your food dollars are going now.

If you save your receipts from groceries and eating out for a few weeks, you’ll have all the data you need to start making plans. As you study your bread crumb trail of information, make notes on your buying patterns. These tend to vary wildly from one household to another. When a team of researchers from the University of Utah analyzed the food buying patterns of more than 10,000 Americans, they found that only about 30% fell into the desirable “balanced” diet category—people who tended to buy fresh food to cook and eat at home, with occasional meals enjoyed out. Meanwhile, many folks were spending nearly half of their food dollars on restaurants and fast food; 7% spent more than a third of their food budget on alcohol.

After you know where you stand, you can start making your food dollars stretch, which will probably require changes in what and how you eat—and drink. As you consider the following strategies for reducing food costs, remember that you don’t need to do everything at once. There are three paths to follow: Develop a food-efficient diet, keep a food-efficient kitchen, and spend your food dollars as wisely as you can. And even better, you may find that you truly enjoy some of these strategies, which are not only good for your wallet, but also maximize flavor and nutrition.

Part of a healthy, low-cost diet involves getting back to basics—spending more time in your kitchen, for example.

If you purchase eggs and other animal products, opt for those that come from humanely raised, pastured animals.

Follow a Food-Efficient Diet

Eat mostly plants. A diet rich in vegetables, fruits, and grains typically costs 20% less than a diet that revolves around meat. From a practical point of view, a thrifty veg-first strategy will take you into a wonderland of inexpensive, protein-rich, and easy-to-store dry beans and peas. If you cook a batch of beans a week, you'll have the makings for burritos, veggie burgers, salads, and soups, all for pennies a serving. Try different kinds: Beans and peas come in a huge range of shapes, colors, sizes, and textures. When you find beans you love, set some aside to grow in your garden.

Before you cook them, soak beans in water for 8 to 24 hours (larger beans can soak longer), as soaking will cut down on cooking time. Then drain and rinse. To finish cooking, simmer beans on the stove or in a slow cooker until tender. Or, cook them (efficiently!) in a pressure cooker in 15 to 30 minutes. You don't even have to soak the beans if you use a pressure cooker: If you start with dry beans, a pressure cooker can have them ready to eat in 30 minutes to an hour.

Choose pastured meat, dairy, and eggs. Pastured products are not only more nutritious but also more eco-friendly than industrial meat. *(To learn more, search for "safe meat" at* www.MotherEarthNews.com.*)*

At stores or direct from farmers, organic and free-range eggs, dairy products, and meat do cost more than their conventional counterparts, but keep an eye on those prices—the gap is closing significantly as mainstream food costs surge upward.

Foods derived from healthy, humanely raised animals that enjoy sunshine and exercise are worth the extra cost, as they provide added benefits when it comes to nutrition, food safety, and basic morality. And if you buy locally, you can add the environment and your local economy to the list of beneficiaries.

For all these reasons, I gladly paid around $3.50 a pound for the turkeys that a local organic farmer raised for me last year. The freshly harvested birds came with a hidden bonus: Simply having this caliber of meat in the house made it hard to make a case for a budget-busting lunch or dinner elsewhere.

Also consider that many homesteads can easily support a few dairy or meat animals, making laying hens, poultry, dairy goats, or a family milk cow well worth their upkeep. The trick to producing your own eggs, dairy, or meat economically is simple: Stick with animals that earn a food profit versus adopting too many as pets.

Improve your snacking smarts. In defense of snacking, it is possible that grazing one's way through the day is more natural, biologically speaking, than sitting down to ceremonial meals three times a day. We were hunter-gatherers not so long ago, which is fine if you're picking blueberries or eating fresh snap peas off the vine. But when the hunter compulsion has you tiptoeing through a dark kitchen to harvest a bag of chips, you may have a costly problem, in terms of both calories and cash.

I am quite familiar with this syndrome, which is why I have learned to turn the most affordable and humble of ingredients—flour, water, and salt—into otherwise pricey snack foods

ISTOCK; PAGE 4: STOCKFOOD/STEVEN MORRIS PHOTOGRAPHY

such as pita chips, pretzels, or toasted bagel slices. I dry lots of seasonal fruits, too, so even after adding purchased nuts, my ever-changing snack mixes cost 70% less than the store-bought versions. And then there are popcorn, parching corn, and several millets and amaranths known for their roasting qualities—any of which may be a perfect fit for your garden and your favorite TV chair. You really *can* do better than chips made hundreds or thousands of miles away that cost $6 or more a bag.

Learn to use locally abundant foods. These include wild-gathered mushrooms, nuts, and berries. Often these can be had for the harvesting (check to see if you need a permit to gather on public land), or you might find them as great seasonal deals at farmers markets. The price usually drops when the crop comes in, so buy when the supply is at its peak to get excellent quality at a good price. From pecans in the Southeast to wild Maine blueberries to the Pacific Northwest's bounty of mushrooms, every area has its riches, and often you can pluck a free harvest yourself.

Eat whole, eat plain. Whole grains are super-nutritious, tasty, and cheap. Whole oat grains, which are called groats, cook into a truly satisfying breakfast for about 25 cents per serving, and a $6 bag of gourmet brown rice can anchor many meals for the whole family. After they're cooked, whole grains can go into spicy stir-fries, pair with roasted meats, or be taken in a sweeter direction with diced apples, cinnamon, and brown sugar. The important thing is to have them around, ready to eat. Whole grains such as wheat berries, groats, hulled barley, or brown rice take about an hour to cook on the stove, or 15 to 20 minutes in a pressure cooker. (Some grains, such as quinoa and millet, cook even faster. You can learn more about these grains by searching *www.MotherEarthNews.com* for each grain type.) By cooking two batches per week, you'll have inexpensive, ready-to-eat whole grains available at all times.

How to Run a Food-Efficient Kitchen

Cook and eat at home. Numbers from the U.S. Department of Labor's 2021 Consumer Expenditure Survey showed that Americans spent about a third of their food dollars away from home—up from 2020 and almost back to the 2019 numbers. Still, it's a no-brainer that homemade food is cheaper than eating out, even if you must buy all of the ingredients, or you are just learning to cook. You will not be alone. Restaurant revenues are down, but sales of cookware and cookbooks are on the rise. And few things are as enjoyable as savoring fresh and fragrant dishes that come from your own kitchen.

Make big batches. Consider a pot of split peas, simmered with onions, celery, and carrots (and, some would insist, good bacon or ham). You now have enough soup for two, three, or even four meals, depending on the size of your household. As soon as the mother batch cools, pack up single servings in

Freeze or dry your own foods for healthy and inexpensive snacks.

DAVID CAVAGNARO; TOP CENTER: RICK WETHERBEE; TOP RIGHT: ISTOCK

freezer containers. They will keep frozen for six months. Do not underestimate the overall value (in cost and time savings) of such efforts. Reheated in the middle of winter, a bowl of frozen chili made with the last peppers and tomatoes from your garden will taste like heaven.

Cooking at home with simple, whole foods is one of the fastest ways to reduce your food budget.

Spend Your Food Dollars Wisely

Shop at home first. If you grow any food, or stock up through farmers markets at peak season (which is when you can get the best deals on any kind of produce), always shop your freezer and pantry first. Even garlic and winter squash won't keep forever, and the garden treasures in your freezer are best used within a few months. Plus, you're less likely to buy things you don't really need if you shop in your own "store" before heading to the market.

Take your lunch. If you pack up some pasta salad made the day before and take it to work, it's almost like having a free lunch. Even a cheap fast-food lunch can cost $10, as will a plastic box of salad bar selections from the supermarket. Compare and contrast: Would you rather have a homemade salad wrap with garden-grown spinach or arugula, or a $6 sandwich that came to you through the labyrinth of our industrial food supply? We should address packaging here, too, because the amount of paper, cardboard and plastic waste involved in a fast-food lunch should make us all queasy. Be sure to bring your own snacks to work, too, which will make it easier to avoid break room doughnuts and vending machine junk.

Make your own wine and beer. Let's say you and your partner like to sip a glass of wine at the end of the day, or maybe you prefer a good beer. Buying two inexpensively priced $10 bottles of wine a week will cost you more than $1,000 dollars a year; two $10 six-packs of beer a week add up to $1,040. And what about those extra bottles purchased for holidays, gifts, or parties? It can add up fast, plus there are all those bottles. Even if recycled, glass bottles are major energy hogs.

If you make your own wine or beer, there will be an upfront investment of about $200 for equipment, which will quickly pay for itself. (See articles on making wine, beer, and hard cider at *www.MotherEarthNews.com/Home-Brewing*.) At my house, we make lovely "country" wines from our apples, plums, and other

Smoothies are a yummy and easy way to use excess produce.

How Much Do You Waste?

A University of Arizona study has shown that most people underestimate how much food they waste. You might think, for example, that you are tossing out only about 1% of the food that goes through your kitchen, but the real number is probably closer to *15%*! Some things will get lost in the refrigerator no matter what you do, but here are some tips to help you save money day after day by minimizing waste.

- Use leftovers by combining them in delicious wraps, omelets, or soups.
- Make smoothies from fruit (and veggies) that will soon be overripe. Ripe, unpeeled bananas will turn black if you freeze them, but they will still be fine for smoothies. Turn overripe apples into spicy applesauce.
- Make your own stocks and broths from meat and vegetable trimmings. You can freeze stock in glass canning jars as long as you leave 2 inches of headspace to allow for expansion.
- Freeze temporary overstocks of bread, including hard crusts or stale bread. Use them to make French toast, bread pudding, seasoned bread crumbs, or savory stratas.
- When you do go out to eat, take along a food container and bring home your leftovers (thus avoiding non-reusable takeout packaging). Many restaurant portions are so huge that you can easily get a second meal from a "normal" entrée. Another good option is to split entrées. Many restaurants are happy to split an order onto two plates if you ask.
- Clean out your refrigerator once a week. Eat, cook, or freeze anything that's worth saving.
- Declare periodic "food rest days," during which the head cook gets the day off, thus encouraging active refrigerator foraging by other household members.

ISTOCK (2)

fruits, but if you have no fruit you can make wine using packaged juices. Stores that sell winemaking supplies usually stock packaged "varietal" juices, such as chardonnay and cabernet sauvignon, which can be fermented into wine at a cost of about $3 per bottle.

Homebrewing is as fun and easy as home winemaking, and the payoff in both cases rises with your level of skill. If you avoid the temptation to invest in equipment you don't really need, and tweak your recipes and procedures to achieve superior results, you will also save a bundle in the long run.

Work with a community-supported agriculture (CSA) program. When various studies have compared the value of food delivered in weekly boxes by member-supported fresh-food programs to that of their retail counterparts, costs come out about even. This is as it should be. There is fundamental absurdity in the notion that organic produce should be cheap just because it is farmer-direct. Yet there are two easy ways to reduce your CSA bill. First, if your CSA program offers them, sign up for extra volunteer hours, which will earn you a significant discount on your membership fee. If you are seriously short of funds, apply for a discounted membership. Loyal patrons of established CSA program farms often donate enough money to cover sponsored memberships for others, and some CSA programs accept food stamps and have grant money to cover costs for low-income members.

Collect coupons for brands you like. It's definitely worthwhile to keep track of coupons for products you buy repeatedly, and to seek out coupons for expensive items, such as olive oil or dairy products. The easiest way is to use the internet, because printable coupons are offered on websites for manufacturers and specific stores. Organic Valley and Stonyfield, for example, offer a selection of coupons on their sites, or you can shop for local specials via websites hosted by big supermarket chains, such as Safeway, Kroger, and Food Lion. Coupons not found using either of these methods are also unlikely to turn up using various coupon-finding sites, many of which require a cumbersome registration anyway.

Buy cooperatively in bulk. If you feel alone in your quest for a fair price for the most basic organic foods—such as whole grains, flours and peanut butter—you can check with a local food co-op

More ways to save: Buy foods in season to store through the cold months, make your own beverages, and volunteer with a local community-supported agriculture group.

JASON HOUSTON; CENTER: ISTOCK; TOP: FOTOLIA/JACKF

Fight the Urge to Buy

- Keep a shopping list, and stick to it. Up to 40% of supermarket purchases are impulse buys.
- Check the prices on beautiful end-of-aisle displays. Promoted products are not necessarily on sale.
- Remind yourself to avoid shopping for food when you're really hungry!

Bulk bins are a great source of discount grains, beans, herbs, spices and more. Preserving some food at home and shopping at local farmers markets during a food's peak season are also big money-savers.

(locate one at *www.NationalCo-opDirectory.com* or *www.GroceryStory.coop/food-co-op-directory*), which may be able to get you a better price than is offered in the store's bulk bins (home of great buys on whole grains, dry legumes, herbs, and spices). Often, they can also order hard-to-find items at your request. Another option is to participate in — or even organize — a buying club, which is a group of about seven or more households that combine their orders to get wholesale pricing on just about anything you might buy at a health food store. (For more on buying in bulk, turn to Page 34.)

In addition to saving you money on staples such as flour and rice, a buying club will connect you with fellow members on distribution day, when everyone gets together to divvy things up. The biggest national distributor, UNFIFresh (*www.UNFIFresh.com*), can provide information.

Glean in season. Historically, when farmers finished harvesting all they wanted of their crops, they invited the local peasants to come and get what was left behind. These days, gleaning is being redefined as "food recovery," which might involve rescuing overripe fruits from a produce manager's discard bin, or channeling a caterer's leftovers to a homeless shelter.

On a more everyday level, large gardens and small farms always produce more food than can be picked or considered marketable. By talking with vendors at your local farmers market or networking through *www.Freecycle.org*, *www.Craigslist.org* or other free databases, you may be surprised at what you can get as long as your requests are keyed to the seasons. In early summer, offer to glean strawberries. In fall, put out a request for bruised apples and pears, which are great for canning. And, when you hear that the first freeze is coming, call up gardeners or farmers you know and ask if there is anything you can come and help pick. Be forewarned: Gardeners are generous people. Bring along lots of boxes and bags for greens, herbs and other end-of-season treasures.

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LIVE SIMPLY

Save Money, Smile More!

Are you drawn to the idea of simple living, but not sure where to start? Three families share the changes they've made that have allowed them to live with less cash income but greater security and life satisfaction.

By Vicki Mattern

Imagine a more fulfilling way to live, with time to relish life's simple pleasures. A quiet evening walk in the woods. Relaxed family meals of flavorful, homegrown food seasoned with good conversation, no TV in sight. Curling up with a book in front of a crackling fire after a day of hard work in your garden.

You *can* enjoy these rewards of simple living—the key is to recognize the full value of becoming a skilled, productive homemaker/homesteader. In today's world, most of us pay other people to provide the things we need, which means we need a job or two outside the home to bring in cash. But by learning how to be more self-reliant, you'll also learn how to save money, live on less income, and achieve greater personal freedom and satisfaction from your daily labor.

Centuries ago, homemaking and homesteading involved a great deal of hard, physical labor. Today, machines and scientific knowledge make most tasks much easier, faster, and safer. Modern homesteading taps the best of contemporary technology to help us master traditional skills and become more self-sufficient and secure.

Expensive designer clothes, factory-made convenience foods, long commutes to work—these parts of consumer culture don't occupy a place in the modern homesteader's value system. Instead, homemakers take pride in producing an entire year's supply of organically grown food, including cheese, meat, and perhaps even wine and beer. Some spin and weave their own clothing or make their family's soap and personal care products. Homesteaders also limit fuel costs by spending more time at home and simply not driving as much, cutting firewood to heat their homes, and often installing renewable energy systems. Even building a log or straw bale home isn't out of reach.

How Much Do *You* Save?

The figures presented in this article and the accompanying chart involve much estimation and some complex calculations. Our hope is that these numbers provide helpful specifics as well as inspiration, but do remember that every family's situation is different. We'd love to have more examples of how simple living saves money. If you've been keeping track of your living expenses and would like to share how much you save by homemaking/homesteading, email us at Letters@MotherEarthNews.com with the subject line "Homestead savings." We'll consider posting your report on our website for other readers to draw ideas and inspiration from.

We talked with three families who have carefully weighed the pros and cons of what many consider the "American Dream" and have decided the numbers just didn't add up. They explain how they've avoided "affluenza" by choosing to pursue a different bottom line, and how this has resulted in total household expenditures that are far less than the U.S. average (see Page 15). Instead of measuring their wealth by job status or how much they own, these families have embraced simple living, healthful foods, strong relationships, and, in turn, deep life satisfaction.

Growing Greener Pastures

Hannah and Eric Noel,
Highgate, Vermont

Through patience, frugal living and family support, Hannah and Eric Noel have laid the groundwork for the homestead they hope to obtain in the coming year. For the past decade, the Noels have been leasing their farmland and house from Eric's parents, who previously operated a traditional dairy farm on the property. The Noels decided to try tending the 300 acres differently, and began raising grass-fed beef and organic produce, which they sell through a community-supported agriculture (CSA) program.

"We believe in eating fresh, wholesome, solar-based foods," says Hannah, "so we decided to start farming that way and offer the same food to families in our community." The couple uses "planned grazing," a pasture-management system that allows their herd to graze on the most nutritious grass available, and that simultaneously nurtures the soil.

The Noels follow a planned-grazing system to raise pastured beef cattle on Vermont's lush grasses.

ORAH MOORE (2); PAGE 12: CORBIS IMAGES

The Noels have learned how to cut costs on groceries and also run a successful homestead business: Their 3-acre organic vegetable garden feeds their family of four, 2 to 4 farm apprentices, and 50 other families who purchase shares through their CSA program. The season begins in June with lettuce, arugula, and radishes, and finishes in December with root crops, cabbage, kale, and leeks. "Through our CSA program, I get to know the families, and I love that," Hannah says. "It feels good to provide them with nutritious food."

Eric supplements the family income with an on-farm auto repair shop. Formerly a race car mechanic, he's now known locally as the "organic mechanic." Hannah, a former schoolteacher, holds weekly interactive farm tours and workshops. Last spring, the family hosted a festival featuring speakers, demos, locally produced foods, and live music. The event attracted more than 350 attendees.

Renting half of an 1836 farmhouse from Eric's parents has helped the couple keep housing costs manageable while saving to buy a homestead of their own. Wood heat, energy-efficient replacement windows and insulation have proved the best ways to save money while keeping warm during Vermont's long, cold winters.

Now the Noels are preparing to apply the lessons they've learned homesteading throughout the past decade to a place of their own. "Wherever we land, whatever we do, what we've learned will help us," Hannah says. Their homestead wish list: 30 to 100 partially wooded acres with good soil, running water, and a site for a greenhouse—all in a rural location not too far from town and their extended family. The Noels say their simple-living approach has required flexibility, patience and persistence, and they plan to continue teaching others about organic foods and farming through workshops, classes, and publications.

RESOURCES FOR HOMEMAKERS

BLOGS/ARTICLES

The Walden Effect: *www.WaldenEffect.org*

Mother's Articles on Sustainable Farming: *www.MotherEarthNews.com/.Sustainable-Farming*

BOOKS (order from *Store.MotherEarthNews.com*)

Homesteading From Scratch by Steven Jones

So You Want to Be a Modern Homesteader by Kirsten Lie-Nielsen

The Weekend Homesteader by Anna Hess

The Frugal Homesteader by John Moody

Little Homestead in the Woods

Anna Hess and Mark Hamilton, Dungannon, Virginia

Having lived on a farm with her family before moving to the city in third grade, Anna Hess long dreamed of returning to her rural roots. As a young adult, she saved her money and, with the help of an interest-free loan from a friend, was able to buy 58 acres with a barn in southwestern Virginia in 2003. She paid $600 an acre.

"It was a piece of land nobody else wanted," she says. "It's mostly steep, wooded hillsides, and you have to walk a third of a mile over swampland to get to the house. But I don't mind, as it gives me time to reflect and decompress."

For the past eight years, Hess and her husband, Mark Hamilton, have carved out a comfortable life as homemakers from about 1 acre at the center of those wooded hills. "Putting more love into a small area is better than spreading it thinly over a large area," she says. The couple's quarter-acre organic garden produces nearly all the vegetables they eat year-round, and their quarter-acre orchard is beginning to bear peaches, strawberries, and other fruits. A small flock of free-range chickens furnishes fresh eggs, meat, and compost.

The dollar cost of all of this bounty? Surprisingly low, to the tune of $9,000 less than the average U.S. household expenditures (see the chart on Page 15). The couple has discovered ways to save money and farm sustainably by using what's already on hand. Their no-till garden beds and orchard stay fertile and weed-free thanks to organic mulch, compost, and cover crops.

Hess has found that a mulch of corrugated cardboard covered with straw breaks down quickly and promotes beneficial soil fungi. She and Hamilton toss kitchen scraps, leaves, and garden debris into the chicken coop, where the chickens mix it with manure and litter to turn out a top-quality, no-work compost. Worms housed in four outdoor bins turn a neighbor's horse manure into rich, garden-ready fertilizer. Citrus and other potted plants grow in a medium Hess calls "stump dirt"—decomposing wood from the surrounding woodland—which she describes as similar to peat moss in its water-holding capacity.

A trained biologist, Hess started their orchard with rootstocks she purchased for just $1 each at a grafting workshop led by county extension specialists. "They show you how to graft fruit tree twigs, called 'scionwood,' and you come home with lots of inexpensive fruit trees of locally adapted varieties," Hess says. "We started our grapes by taking hardwood cuttings from a friend's orchard. If you know

Anna Hess and Mark Hamilton grow a quarter-acre garden, and recently branched out by adding an orchard.

ANNA HESS (2)

Growing a large garden and preserving its bounty are two ways modern homesteaders trade time and labor for big savings and better food quality.

how to propagate plants and save seeds—and are patient—you can get the plant side of your farm going without much cash."

The couple also pays virtually nothing for housing. Their mobile home was "free for the hauling," obtained from a local trailer park eager to dispose of its oldest unit. "It cost $2,000 to move it, but now we live mortgage-free. It's a great way to get started [homesteading] quickly if you don't have startup capital," Hess says. Hamilton made repairs and renovations, and other than the double-glazed windows, most of the materials were free—picked up curbside or obtained from a giveaway held by a service organization that builds houses. Heating is inexpensive, too, thanks to a Jøtul stove, fueled with about 2 cords of wood per year.

Both Hess and Hamilton work full time on their homestead, so to pay for electricity and other basics, the couple operates a micro-business from home. The Avian Aqua Miser, a poop-free chicken waterer, is Hamilton's ingenious twist on an industrial design (go to *www.AvianAquaMiser.com*). Hess finished a book, *The Weekend Homesteader*, in 2012 (see "Resources for Homemakers," Page 14). "It's important to find a revenue stream you can operate from the farm," Hess says. "Our business allows us to sell online to people with higher incomes so that we can make a living wage."

Hess and Hamilton have also learned that living simply (and loving it!) is a mindset that can be cultivated. Spend time with others who share your values, Hess says, and limit media consumption, especially TV. Most of all, "Be mindful of the things that bring you bliss and don't cost money—the tree that bore its first fruit, long dinners with your spouse, having a happy marriage. ... You can't pay for those things."

How Much You Can Save, the Homesteader's Way

Three modern homesteading families shared with us their average annual spending in several areas. The chart below reveals how their expenses compare with the average U.S. household expenditures in the same areas. *All numbers given are per capita.*

	Noel Family	Hess and Hamilton	Mather Family	U.S. Average*	Average Savings
Food purchased (mostly organic)	$2,333	$1,507	$1,400	$3,335** (for at home and away)	$1,588
Housing (including maintenance and utilities)	$2,000	$577	$550	$5,521	$4,479
Transportation	$583	$1,768	$750	$3,317	$2,283
Entertainment	$100	$138	$500	$1,029	$783
Expense totals	$5,016	$3,990	$3,200	$13,202	$9,133
In addition to their living expenses, our homesteaders also calculated the value of the fresh, organic, and free-range foods they produce for their families.					
Value of home-produced food (mostly organic)	$1,167 (beef, chicken, eggs, vegetables)	$2,321 (chicken, eggs, fruit, vegetables)	$1,200 (eggs, fruit, vegetables)		
Amount spent to produce food	$353 (garden, animals)	$554 (garden, animals)	$100 (garden, hens)		
Net value	$814	$1,767	$1,100		

**Source: U.S. Bureau of Labor Statistics, 2011*

***Number adjusted with data from the Agricultural and Resource Economics program at West Virginia University to reflect a mostly organic diet*

TOP LEFT: DREAMSTIME/OTOKIMUS; TOP RIGHT: SAXON HOLT

Richer Living Off the Grid

Cam and Michelle Mather, Kingston, Ontario

The Mathers use a solar-charged chainsaw (above) to cut firewood to heat their home.

KATIE MATHER (2)

For Cam Mather, the path to energy, food and financial independence began in his parents' suburban backyard, where he planted his first vegetable garden at age 16. "It was the start of a journey to find meaning that you simply can't find watching television," Cam says. After a couple of road stops (first at a city apartment, then a home on a busy suburban street), Cam and his wife, Michelle, were able to buy their dream homestead: a simple house on 150 wooded acres in the wilds of eastern Ontario, beyond the power lines and much closer to nature. Although they've never earned more than the median Canadian income, the Mathers managed to buy their homestead outright with cash.

"We knew it would be harder to make a living out here, so we committed to be mortgage-free," Cam says. "We lived frugally and paid off our mortgage [on the suburban home] so we could put everything from the sale toward the new place."

Still, Cam says the learning curve was steep: "Moving to an off-grid house with absolutely no clue about electricity was terrifying." Twenty years later, the Mathers rely almost entirely on renewable sources of energy. Homegrown wood fuels their energy-efficient Pacific Energy woodstove, while solar energy powers their water heater, appliances, electric bike, and chainsaw. "There's never a shortage of firewood," Cam says. "Even after 20 years, I absolutely love cutting wood. Why pay for a gym membership if you can work in harmony with nature instead?"

To reduce the use of their gas-powered backup generator to just twice a year, Cam installed a wind turbine for about $10,000. "That seems like a big investment, but I consider other factors, such as the possibility that gas might not always be available," he says. The Mathers estimate they've invested $40,000 to become energy independent, but they say that, with recent technological advances, someone could go off-grid for about half that cost today.

The couple grows nearly all of their own food in several organic gardens spread over an acre. Green manures (such as buckwheat), compost, and rotted hay collected from neighbors have transformed the native sandy soil into a friable loam rich in organic matter and plant nutrients. The Mathers save money on grocery expenses by supplementing their homegrown vegetables and berries with eggs from their small poultry flock, purchasing sale-priced bulk items, and keeping their root cellar stocked with potatoes, squash, carrots, and home-canned goods. "By moving your diet to be more plant-based, you get more bang for your buck," writes Cam in his book *Thriving during Challenging Times*.

Cam says making a living in the country can involve cobbling together an income from several sources while working as a homemaker. "You make a choice: Do you want to drive an hour each way to make a higher income, or find ways for both people to work from home?" The Mathers have opted for the latter, operating an electronic publishing business, offering on-site workshops that teach self-reliance, selling kindling, and running a CSA program that supplies food for 12 families.

"Many people who choose this lifestyle want to make a living only from the food they produce, but the challenge is competing with the low prices of the industrial food system. You'd like to charge $7 per dozen for your free-range organic eggs, but you can't. So you find other income sources," Cam says. "When people take our workshops, they say, 'Wow, this is so great to be able to live like this.' We earn a fraction of what we made working in the city, but what we're doing now is more in line with our beliefs."

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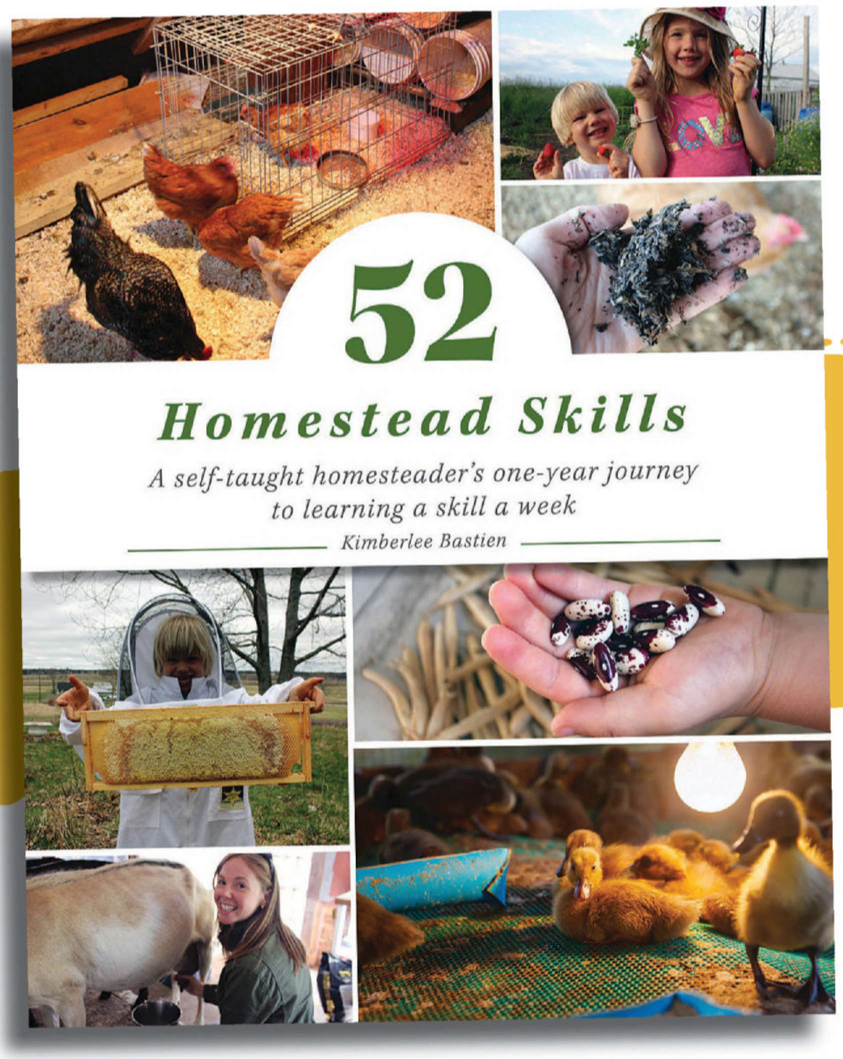
52
Homestead Skills
A self-taught homesteader's one-year journey to learning a skill a week
Kimberlee Bastien

Roasted Radishes

It's hard to say what I like most about roasted radishes. It could be their vivid colour or their juicy goodness or the fact that they turn out perfectly every time I make them. Whatever the reason, you haven't really tasted radishes until you've had them roasted. I think you'll be pleasantly surprised by their sweet, mild flavour.

instructions

- Preheat oven to 400° F.
- Coat radishes with olive oil and lemon juice.
- Sprinkle with salt and pepp
- Arrange the radishes cut-sic down in your pan.
- Roast for about 40 minutes.
- Sprinkle with parsley and gobble

P.S. Save those radish tops! You ca a side dish.

ingredients

- 20 radishes, trimmed

52 Homestead Skills

209

project 8

build a beehive

21

52 Homestead Skills follows homesteader Kimberlee Bastien as she learns one homesteading skill per week over the course of an entire year. The book details all of Bastien's adventures, from building a beehive and becoming a beekeeper to creating her own laundry and dish soap. Whether you already live on a homestead, are transitioning onto one, or are only thinking about it, *52 Homestead Skills* will help turn your dreams into a life worth living.

Packed with skills such as making deodorant, building a chicken chunnel, and freezing jam, the 52 projects in this book will prove helpful to any homesteader (or anyone just looking to do more on their own). Life on a homestead might not always be easy, but as Bastien writes, "The learning never ends, and that's OK. Because life without a challenge would be boring." This book will help you through even the hardest parts of living on a homestead, and add a little bit of fun to the mix!

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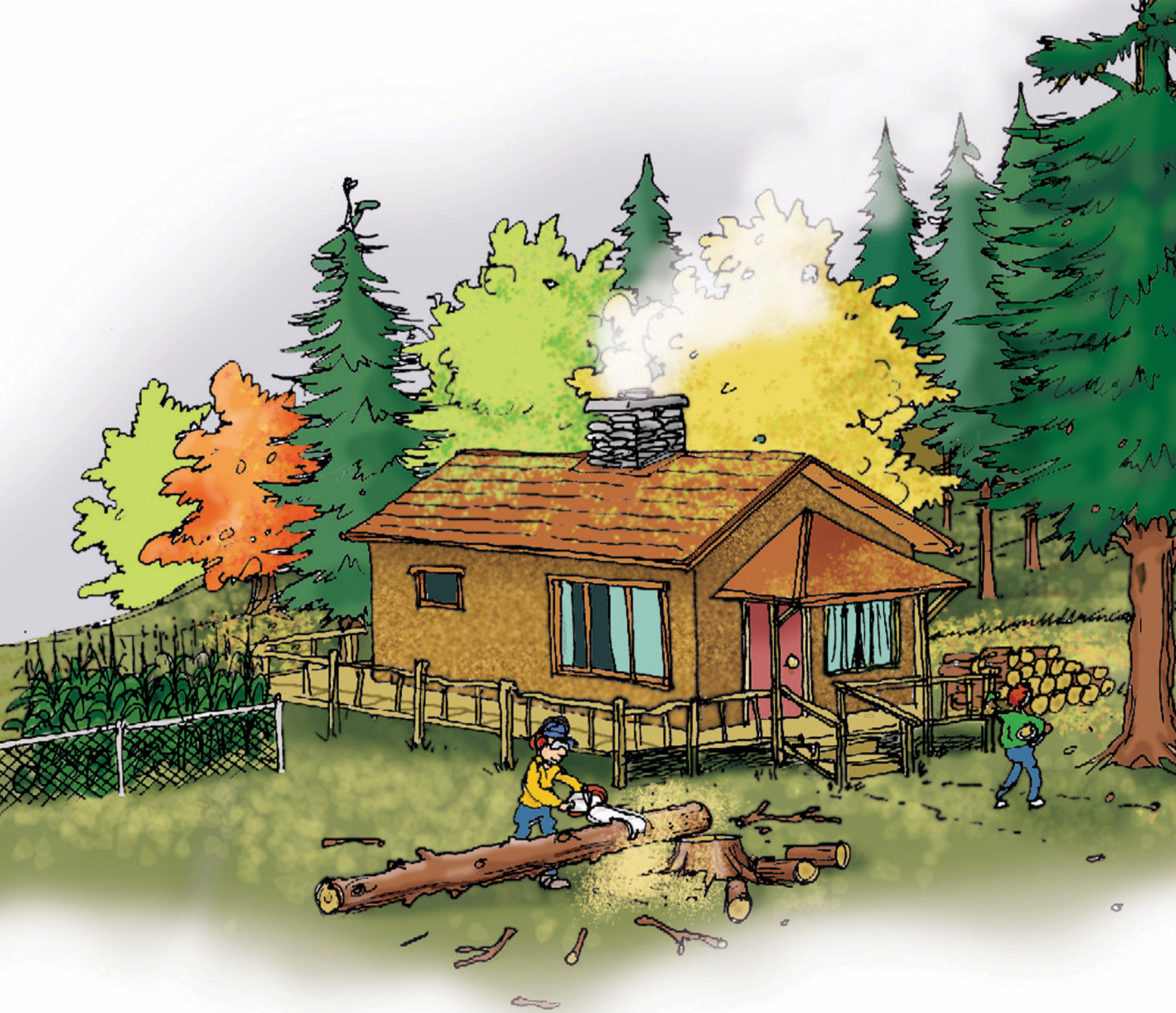


LIVE ON LESS *and Love It!*

Try these 75 inspiring ideas to enjoy life more while spending and consuming less.

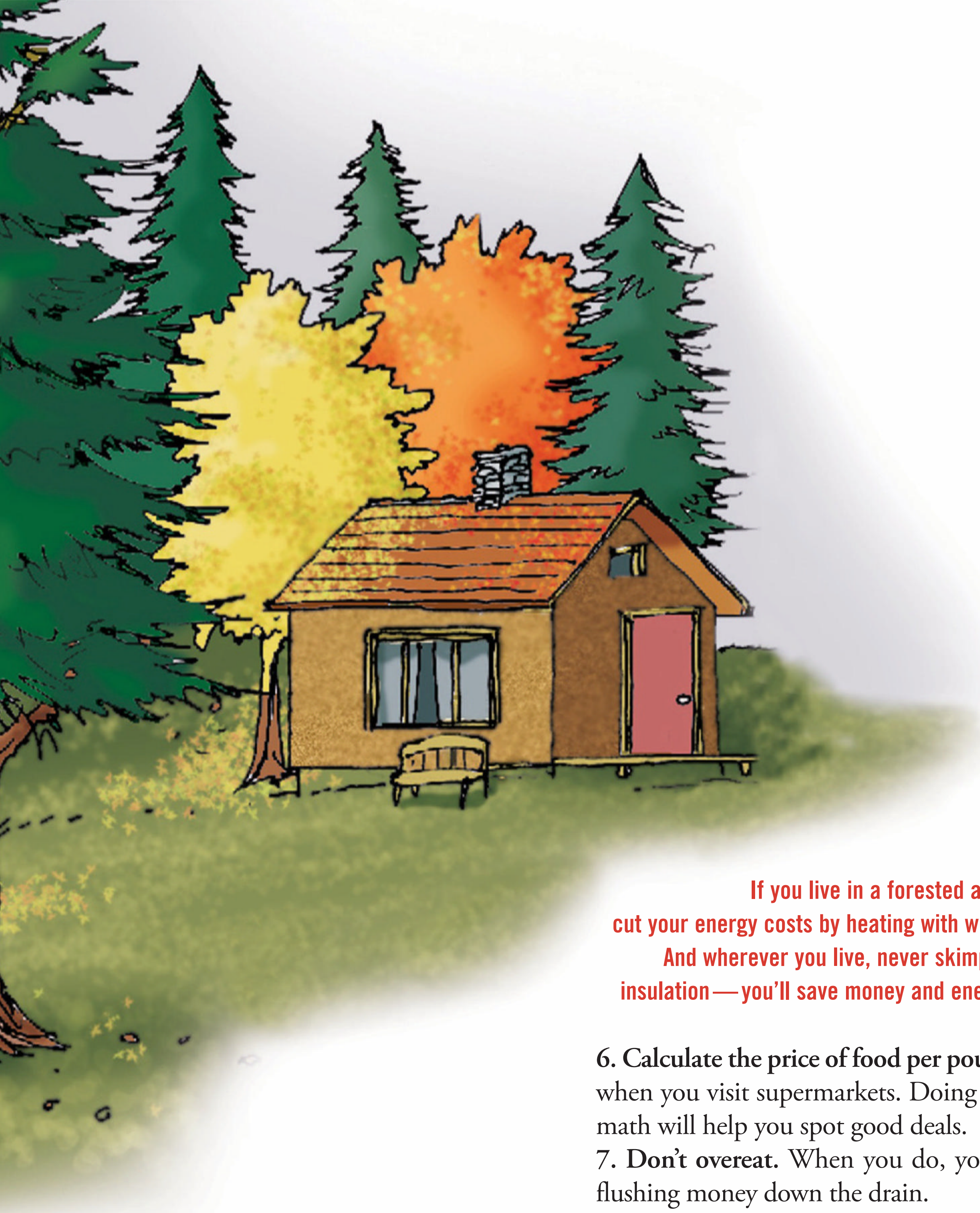
By Craig Idlebrook
Illustrations by Brian Orr

On paper, we are poor. We're in such a low tax bracket that I have trouble convincing the government of our tax return's accuracy; they simply can't believe families can live on that kind of money. (In 2005 we made $4,303.84 combined; in 2004 we made half that.)

Yet we've saved enough money to buy land without a mortgage, we have no credit cards or monthly bills, I work 20 hours a week from home, and my daughter has two stay-at-home parents. We never want for anything, and we have a lot of fun.

We've spent more than a decade making smart, daily financial decisions. We didn't want to spend our time earning money at jobs we didn't like, so we focused on how to stretch our money. We found that by controlling our day-to-day expenses, we could save a lot of money without sacrificing our quality of life.

Here are 75 money-saving tips to consider, drawn from our own experiences. Find what works for you to enjoy living on less!



If you live in a forested area, cut your energy costs by heating with wood. And wherever you live, never skimp on insulation—you'll save money and energy.

Good, Cheap Food

1. Buy raw ingredients instead of prepackaged foods, and learn how to cook if you don't already have kitchen skills. You'll save on food bills, and your body will thank you in the long run.

2. Buy in bulk from a local health food store or place bulk orders directly with mail-order companies. If you can't meet their minimum order size, share an order with another family, or organize a larger food-buying club.

3. Avoid the middleman and buy directly from farmers. Look for farm stands, community supported agriculture programs (CSAs), and farmers markets.

4. Eat fruits and vegetables in season, when they are least expensive. Stock up when they're cheap and freeze or can any excess for later use.

5. Keep up with what's in your refrigerator and make sure none of your food spoils. Once a week, make soup or casseroles to use up vegetables and other leftovers.

6. Calculate the price of food per pound when you visit supermarkets. Doing the math will help you spot good deals.

7. Don't overeat. When you do, you're flushing money down the drain.

How to Avoid Rent

8. Find a live-in elder care position. Often, no qualifications are needed other than compassion.

9. Help renovate a house in exchange for lodging. This is how we live in our home.

10. For short-term stays, become a house-sitter or pet sitter.

11. For long-term stays, become a caretaker. A good website where you can find such caretaking jobs is *www.Caretaker.org*.

Find and Build Your Nest

12. Look beyond realtors' listings to find cheap property. Try local penny papers.

13. Don't be afraid to ask. If you see land you like, ask the owner whether it's for sale. It might be cheaper than you think.

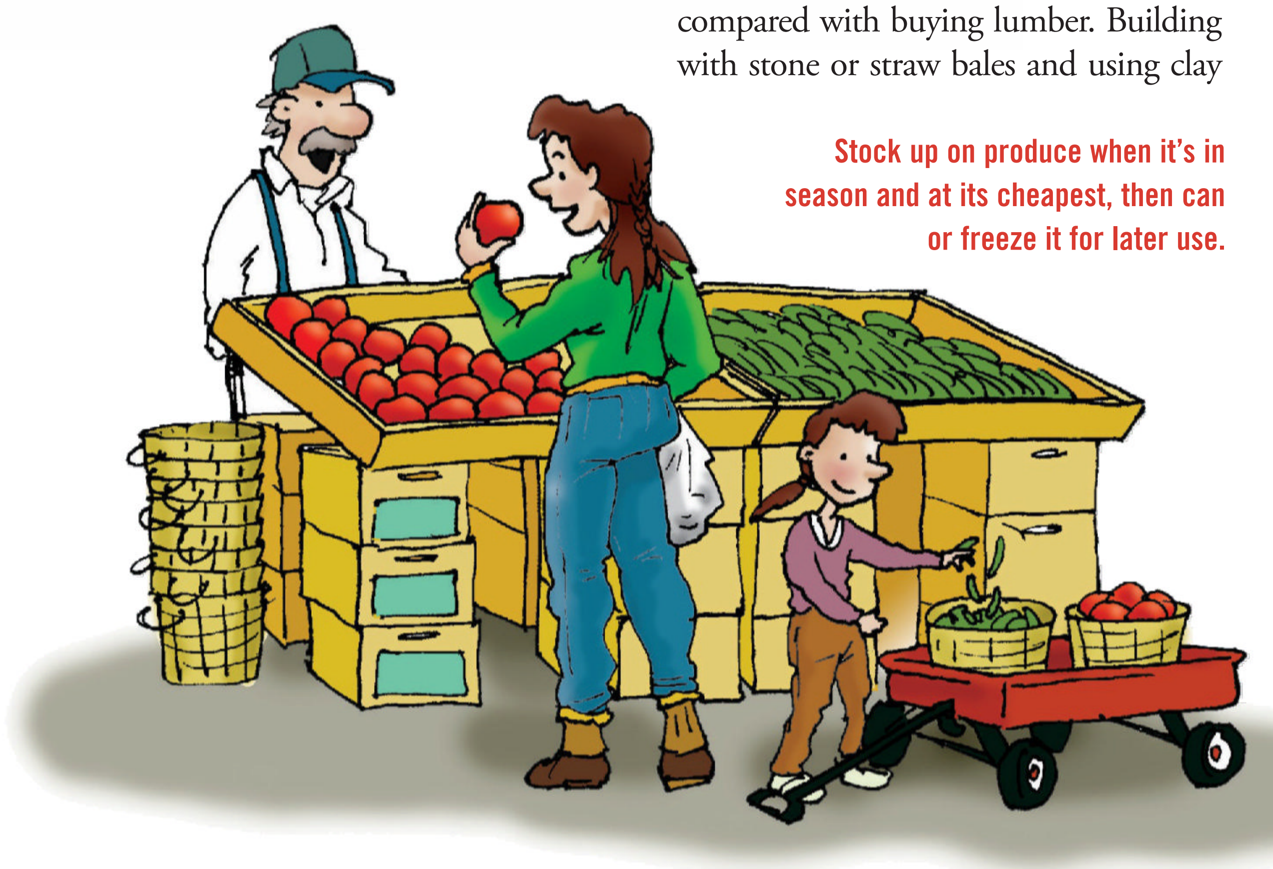
14. Salvage materials for your new home. Look for someone who's renovating and might let you cart away old materials; check the yellow pages for used building materials; or look for online groups, such as *www.Freecycle.org*, where people trade all kinds of unwanted items.

15. Never skimp on insulation. Build your home tight, and it will cost much less to heat. You may even be able to get away with a woodstove or other supplemental heating and avoid the cost of buying and running a central heating system.

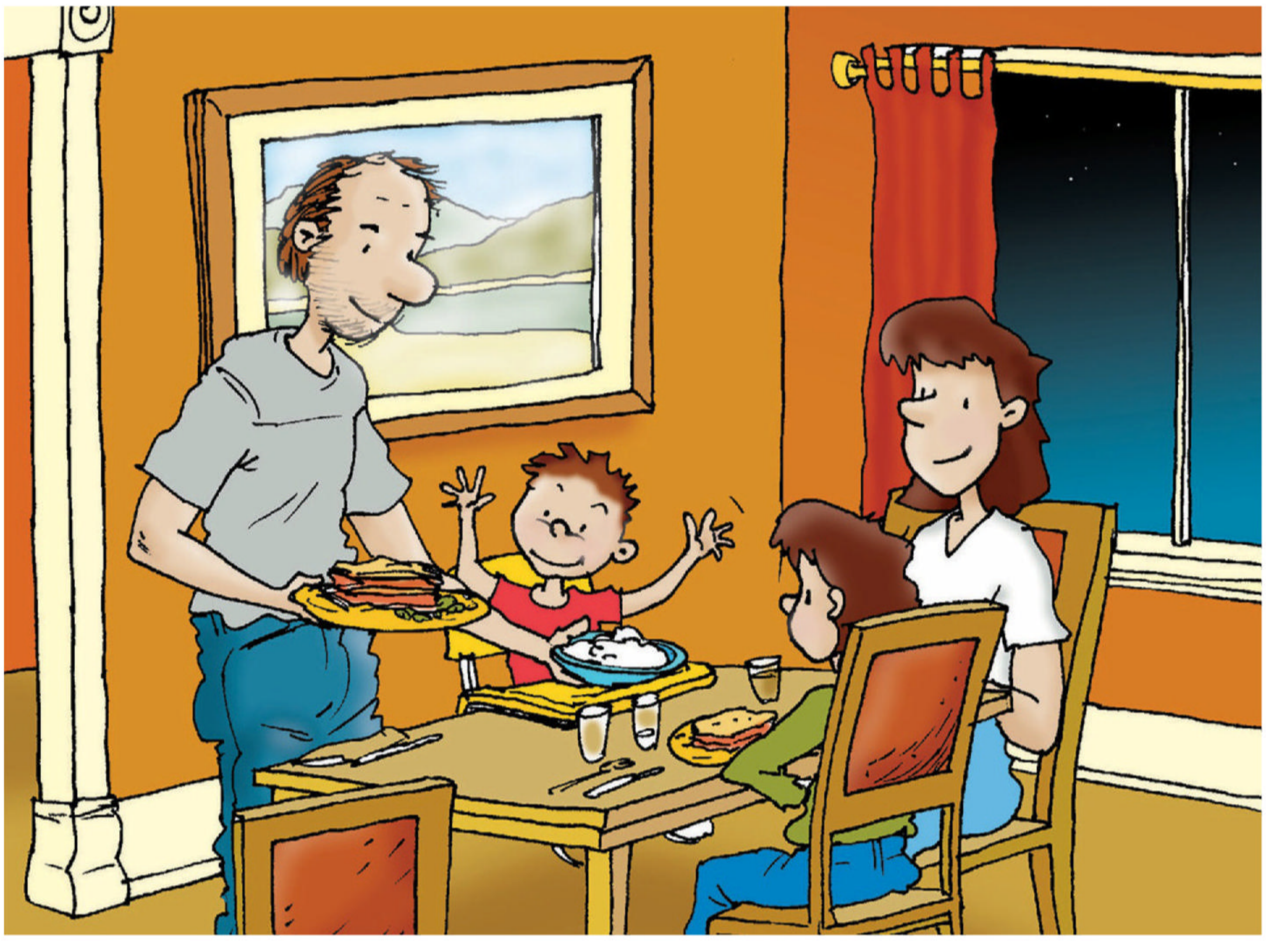
16. Barter for services. Some communities have organized time banks, to make bartering for services easier. You can learn more about them at *www.TimeBanks.org*.

17. Buy into a piece of land with another family. Be sure to check local zoning ordinances before you buy to be sure you can legally subdivide a property.

18. Build with natural materials found on-site. If you have wood, the equipment to mill it yourself is relatively inexpensive, compared with buying lumber. Building with stone or straw bales and using clay



Stock up on produce when it's in season and at its cheapest, then can or freeze it for later use.



Make a habit of eating at home: It's almost always cheaper, healthier, and better-tasting than eating at restaurants or fast food joints.

for plasters are other relatively inexpensive natural building options.

Keep Home Upkeep Costs Down

19. Close off unused rooms to save on heat and air conditioning.

20. Be efficient with your appliances. Have a big baking night when you're going to use the oven. Let your woodstove also be your dryer and water heater.

21. Take advantage of natural weather patterns to heat and cool your house. In summer, open the windows at night and close them again by noon.

22. Place your refrigerator in the coldest part of the house so it requires less energy to keep the temperature low.

23. Wash your clothes in cold water. It's the friction that does most of the cleaning, not the heat.

24. Switch off your water heater when you're not going to use it for extended periods of time.

25. Buy energy-efficient light bulbs. The savings on your electric bills add up fast.

26. Unplug any unused electric items with built-in lights, clocks, or timers. They use a lot of power just sitting there.

Creative Transportation

27. Carpool with friends or co-workers. Look for online listings to find carpools.

28. Ask whether your city has a car-share program. If it doesn't, consider starting one with people you trust.

29. Convert a diesel car to run on used vegetable oil. You'll pay once for the conversion or kit, but after that all of your fuel can be free. All you have to do is find a restaurant that wants to dispose of its used oil and will let you cart it away.

30. Keep track of your gas mileage and look for ways to improve it. Keep tires properly inflated and don't speed.

31. Do as many errands as possible with each car trip around town instead of making multiple trips. You'll save a lot of gas.

32. Book airplane trips well in advance to get the lowest possible fare. Then show up early and, if you're flexible, offer to be bumped in exchange for free tickets if a plane is overbooked.

When You Can't Avoid Shopping

33. Don't go into stores unless you need something. Always carry a shopping list.

34. Hit end-of-season sales for items from coats to gardening supplies.

35. Borrow the items you need from family or friends. Check out Freecycle or set up borrowing co-ops for tools.

36. Try to find items used before you buy new. Look online, in the classifieds, and at garage sales, estate sales, and thrift stores.

37. When buying new, choose high-quality, durable items. Spending more up front is often cheaper if you won't have to replace the item in the near future.

38. Instead of shopping, scavenge. Watch the curbs in a college town at the end of the semester.

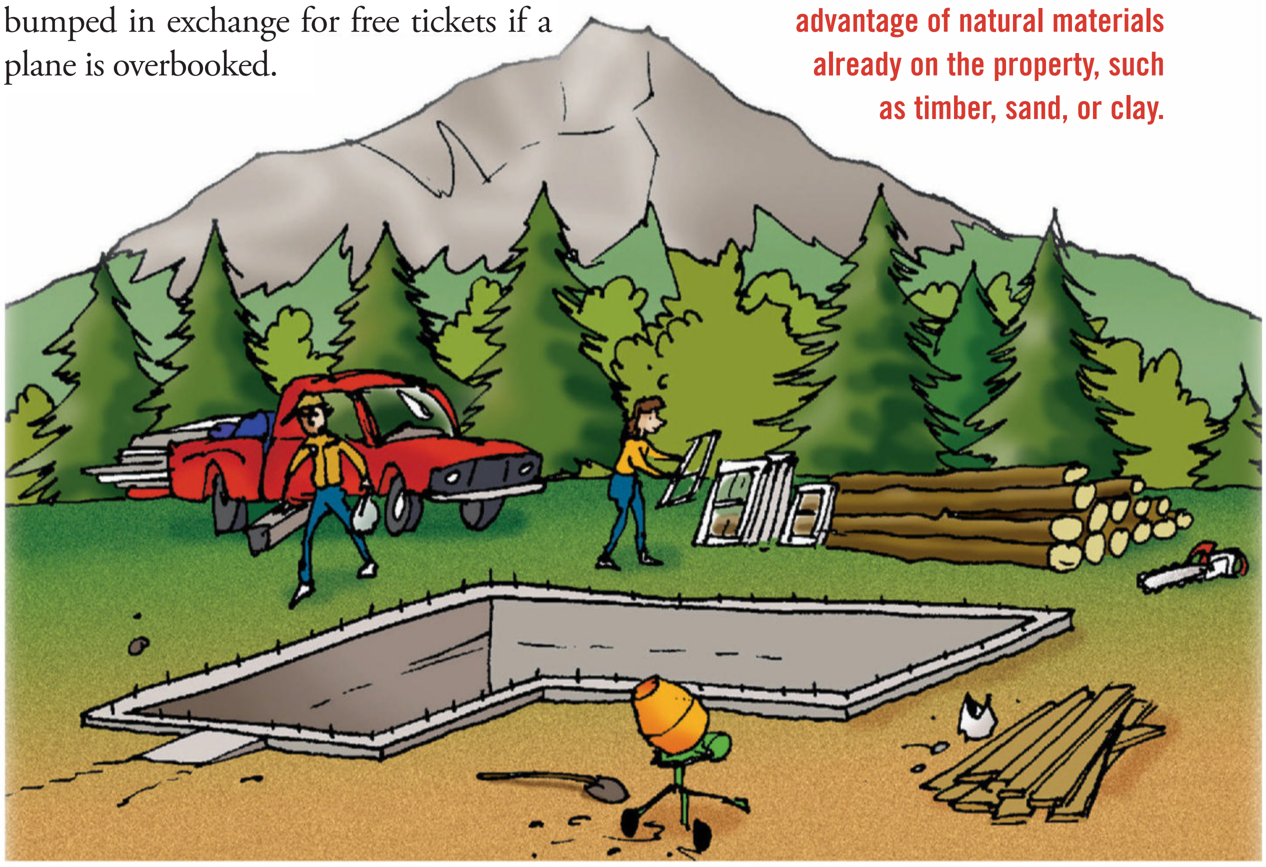
Get Some Clothes On!

39. Buy clothing used whenever possible. You may have luck finding clothes at garage sales, or find a wider selection at thrift stores, consignment shops, and on eBay.

40. Have a clothing exchange party to trade unwanted clothing with friends.

41. Try sewing. Look for material in thrift stores, or rework old clothes into new.

42. Watch the clearance racks. It's always amazing how much stores are willing to mark down unsold clothing.



If you build your own home, take full advantage of natural materials already on the property, such as timber, sand, or clay.

For Your Health

43. Ask doctors and dentists whether they have sliding-scale fees.

44. Look for free or low-cost clinics and/or medical schools for treatment. (But be warned, sometimes you get what you pay for. I have a couple of bad fillings from a new dentist.)

45. Do preventive maintenance on your body. Exercise, eat well, quit smoking.

46. Campaign for a better health-care system!

Cutting Education Costs

47. For the college-bound, take some general education classes at a community college where the tuition is low. Just check carefully with your school of choice to make sure the classes will transfer.

48. Attend an in-state college. Establish residency for a year or two beforehand, if need be. The money saved can be well worth the time.

49. Buy your college books used online. Don't give in to the monopoly of the college bookstore!

50. Watch for unique scholarship opportunities, including those that involve resources other than cash. (I once received a case of organic macaroni and cheese for making the dean's list.)

51. Audit classes that you only want for the learning, not the credit.

52. For lessons, try bartering. For example, my wife is planning to do some photography in exchange for dance lessons.

Cheap Entertainment

53. Discontinue your Internet service and utilize a wireless "hot spot" at a café or anywhere else that offers free Internet access.

54. Rediscover the radical notion of the library. Imagine Internet access and thousands of books, CDs, and DVDs free!

55. Volunteer to usher for concerts, plays, and other events. (I haven't paid for a play in years.)

56. Find low-cost fun in your local paper, such as free concerts, events, and movies.

PUBLIC
LIBRARY

Rediscover the radical notion of a public library: Get books, music, movies, and an education free!

57. When at a concert or movie, avoid buying anything to eat or drink. Some places will even let you take your own snacks from home.

58. Take turns entertaining with friends holding parties, potlucks, or music nights.

59. Occasionally, go ahead and spend the money. Saving money's like going on a diet: If you try to starve yourself, you'll end up consuming more in the long-run. If there's a form of entertainment you value, consider splurging.

By controlling our day-to-day expenses, we could save a lot of money without sacrificing our quality of life.

See the World for Less

60. Volunteer for organizations, such as World Wide Opportunities on Organic Farms (WWOOF, *www.WWOOF.net*), that provide food and lodging in exchange for a reasonable amount of daily work.

61. Trade your home with friends from all regions of the country for free lodging, or check out *www.CouchSurfing.com* for more destination options.

62. Go camping or rent a cabin. Don't overlook state parks and national forests. They're often less expensive and less crowded than national parks.

63. Try a local vacation. Chances are, there's something great to see within a 100-mile radius of where you live.

64. Ask hotels about discounted distressed-traveler rates, especially if you hadn't planned to stop overnight but must because of inclement weather.

65. There's no law against haggling with a hotel on room rates!

66. Make your vacations pay for you by combining them with work. I once volunteered for my school to check out an innovative learning program in Vermont and got to stay in a bed-and-breakfast free.

67. Buy food at local supermarkets when traveling. It's cheaper than eating out.

68. Choose a vehicle with fold-down seats if you're renting a car or truck. Find a safe place to sleep for the night, and you have instant, snug lodging.

Truly Happy Families, for Cheap

69. Definitely choose used clothes for babies. Babies are so cute, they don't need to be stylish.

70. Trade baby-sitting time with other couples and have rotating play groups with other families.

71. During the holidays, draw names for gift-giving with groups of family or friends rather than buying a gift for everybody. A fun variation or addition to this is the white elephant holiday party, where everyone brings unwanted items and other joke gifts.

72. Invoke a gift-giving spending cap.

73. Give homemade gift certificates for a massage or baby-sitting time.

74. Donate to causes for gifts. You'll support a worthwhile organization and save on sales tax and shipping costs.

75. Swallow your pride; accept your family's help every now and then. They'll feel good, and there's bound to be a way you can return the favor sometime.

These suggestions are just a starting place. Make a game of it if you can, and keep it fun.

After all, it's only money.

GROW $700 OF FOOD *in 100 Square Feet!*

If more of us grew a little food — instead of so much grass — our savings on grocery bills would be astounding.

By Rosalind Creasy
with Cathy Wilkinson Barash

I receive lots of questions about growing food to help save money. While working on my book, *Edible Landscaping*, I had an *aha!* moment. As I assembled statistics to show the wastefulness of the American obsession with turf, I wondered what the productivity of just a small part of American lawns would be if they were planted with fruits and vegetables instead of grass.

I wanted to pull together some figures to share with everyone, but calls to seed companies and online searches didn't turn up any data for home harvest amounts — only figures for commercial agriculture. From experience, I knew those commercial numbers were much too low compared with what home gardeners can get. For example, home gardeners don't toss out misshapen cucumbers and sunburned tomatoes. They pick greens by the leaf rather than the head, and harvests aren't limited to 2 or 3 times a season.

For years, I've known that my California garden produces a lot. By late summer, my kitchen table overflows with tomatoes, peppers, and squash; in spring and fall, it's broccoli, lettuces, and beets. But I'd never thought to quantify it. So I decided to grow a trial garden and tally up the harvests to get a rough idea of what some popular vegetables can produce.

ROSALIND CREASY; PAGE 22: SAXON HOLT & ROSALIND CREASY

The Objective

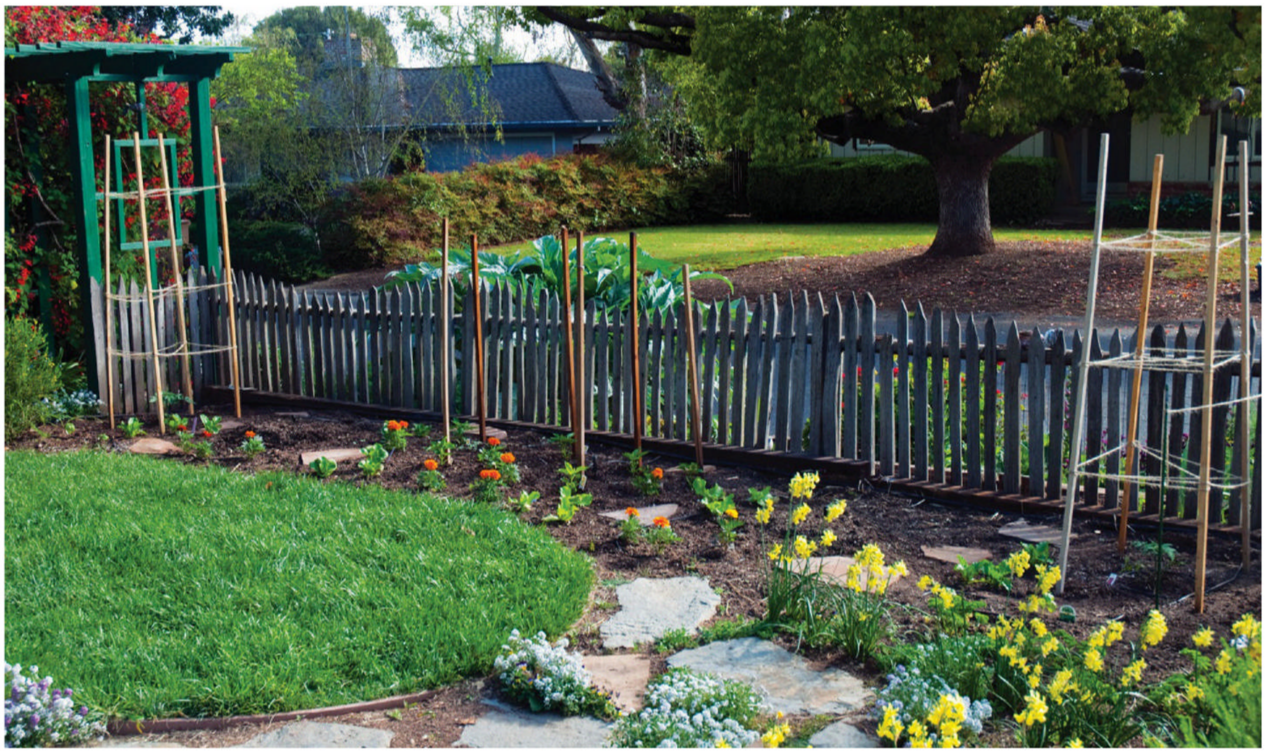
I took a 5-by-20-foot section of garden bed by my tiny lawn to see how much I could grow in just 100 square feet. My goal was to produce a lot of food, and because it was part of my edible landscape, it had to look good, too.

The Plants

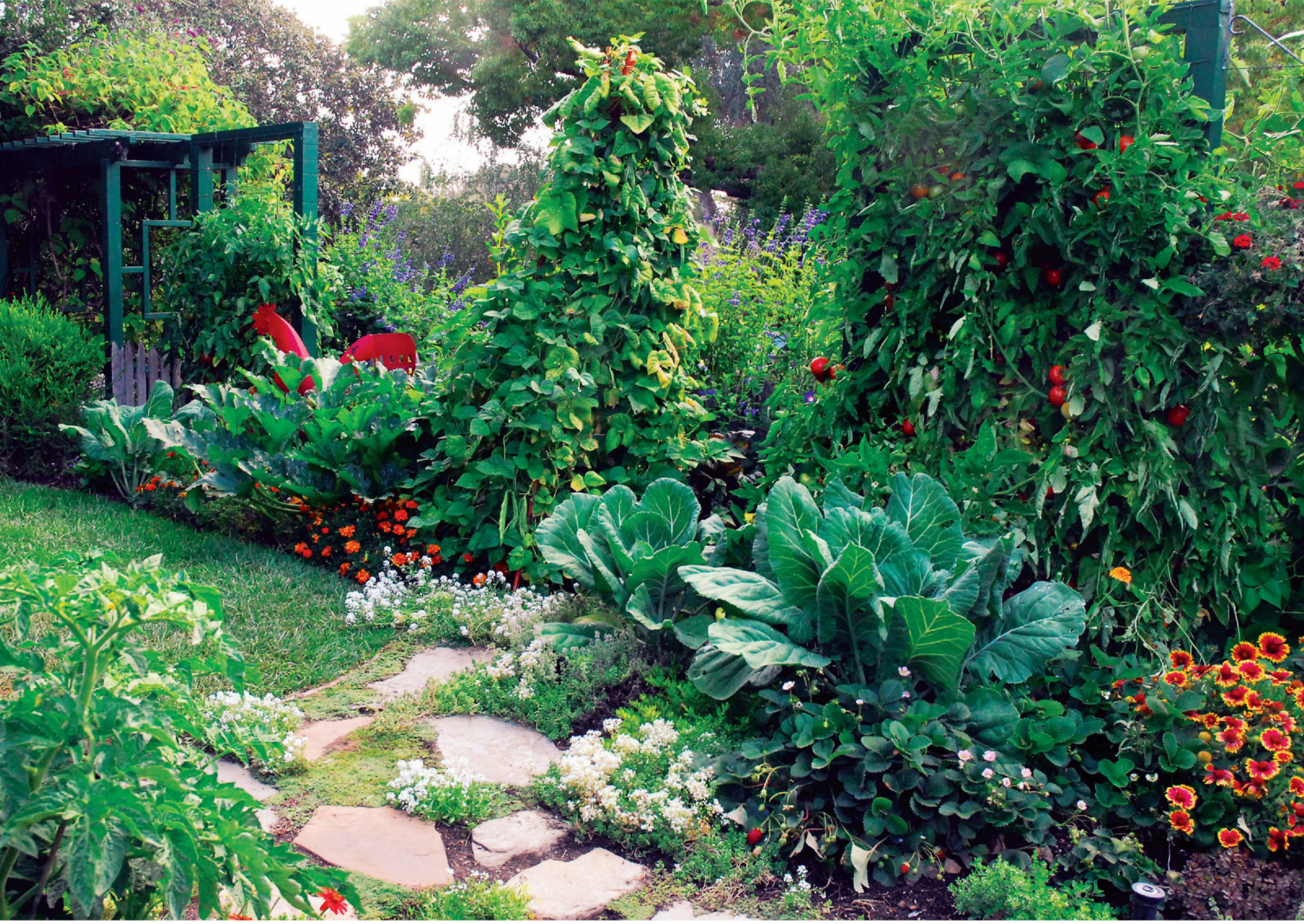
I wanted to make this garden simple — something anyone could grow. I didn't include fancy vegetable varieties; I chose those available at my local nursery as transplants. I also selected vegetables that are expensive to buy at the supermarket, as well as varieties that my experience has told me produce high yields.

The first season I grew the following:

- Two tomato plants: 'Better Boy' and 'Early Girl'
- Four basils (expensive in stores but essential in the kitchen)
- 18 lettuces: six 'Crisp Mint' romaine, six 'Winter Density' romaine, and six 'Sylvestra' butterhead
- Six bell peppers, which are often luxuries at the market when fully colored: two 'California Wonder,' two 'Golden



By carefully planning each step, Creasy thoughtfully integrated her garden into her yard.



In her garden, the author grew (from left) 'Celebrity' tomatoes on the green trellis; two basil plants in front; 'Raven' zucchini with three chard plants behind it; 'Musica' string beans on a tipi; an arbor with 'Early Girl' tomatoes; two collard plants; and two 'Blushing Beauty' bell peppers.

Bell,' one 'Orange Bell,' and one 'Big Red Beauty'

- Four zucchinis: two green 'Raven' and two 'Golden Dawn'

The only plants I grew from seed were the zucchinis. Hindsight is always 20/20: I should have thinned each of the zucchini hills to a single seedling, but I left two in each hill. As a result, I needed to come up with creative uses for zucchini, including giving them away as party favors at a dinner I hosted.

Luscious homegrown tomatoes, spicy basil, robust squash, and always-prolific zucchini were harvested from Creasy's 100-square-foot garden bed.

It looked a bit barren at first, but the garden flourished—especially the lettuces. Within several weeks, I started picking outer leaves for salads for neighbors and myself. The weather forecast predicted temperatures in the upper 90s; I was heading out of town and feared the lettuces would bolt, so I harvested the entire heads earlier than I normally would. Within about a month of transplanting the lettuces into the garden, I had grown enough for 230 individual servings of salad. And by that time, the tomatoes, zucchinis, and pepper plants had nearly filled in the bed.

A Living Spreadsheet

Although I've grown hundreds of varieties of vegetables over the years and kept rough notes, this garden was different. My co-author Cathy created spreadsheets for each type of plant, and we kept meticulous records each time we harvested. We recorded amounts in pounds and ounces, as well as the

ROSALIND CREASY (4)

number of fruits (for each cultivar of tomato, zucchini, and pepper) or handfuls (for lettuces and basil).

The Investment: Time and Money

This 100-square-foot plot took about eight hours to prepare, including digging the area, amending the soil, raking it smooth, placing stepping stones, digging the planting holes, adding organic fertilizer, and setting the plants and seeds in the ground. On planting day, I installed homemade tomato cages (store-bought ones are never tall or sturdy enough) and drip irrigation. And I mulched well—a thick mulch is key to cutting down on weeding, which is the biggest time waste in the garden, in my opinion.

We hand-watered the bed for a few weeks to allow the root systems to grow wide enough to reach the drip system. Three times during the first month we routed out a few weeds, which was only necessary until the plants filled in and shaded the soil.

Tomatoes in my arid climate are susceptible to bronze mites that cut down on the harvest and flavor. To prevent mites, we sprayed sulfur in mid-July and again in mid-August, which took about 30 minutes each time. In rainy climates, gardeners often need to prevent early blight on tomatoes. To do so, rotate tomato plants to a different area of the garden each year and mulch well. After the plants are a few feet tall, remove the lower 18 inches of leafy stems to create good air circulation.

For the rest of the season, we tied the tomatoes and peppers to stakes as they grew upward, cut off the most rampant branches, and harvested the fruits. The time commitment averaged about an hour and a half each week. (Our harvesting consumed more time than average because we counted, weighed, and recorded *everything* we picked.)

E.B.Stone
ORGANICS
All Purpose
Plant Food
BLACK FOREST
ORGANIC COMPOST

Even after factoring in the expense of some plants and fertilizer, a small garden can still save you big bucks on groceries.

The Results

To determine what my harvest would cost in the market, I began checking out equivalent organic produce prices in midsummer. On a single day in late August, I harvested 49 tomatoes, 9 peppers, 15 zucchinis of many sizes, and 3 handfuls of basil—which would have totaled $136 at my market that day.

From April to September, this little organic garden produced 77.5 pounds of tomatoes, 15.5 pounds of bell peppers, 14.3 pounds of lettuce, and 2.5 pounds of basil—plus a whopping 126 pounds of zucchini! Next time I won't feel bad about pulling out those extra plants.

Getting the Most Food from a Small Area

Choose indeterminate tomatoes. They keep growing and producing fruit until a killing frost. (Determinate varieties save space but ripen all at once.)

In spring, plant cool-season vegetables, including lettuce, arugula, scallions, spinach, radishes, mesclun, and stir-fry green mixes. They are ready to harvest in a short time, and they act as space holders until the warm-season veggies fill in.

Grow up. Peas, small melons, squash, cucumbers, and pole beans have a small footprint when grown vertically. Plus, they yield more over a longer time than bush types.

Plants such as broccoli, eggplant, peppers, chard, and kale are worth the space they take for a long season. As long as you keep harvesting, they will keep producing until frost.

Author Rosalind Creasy in her landscaped Northern California vegetable garden.

Creasy's pet rooster, Mr. X, checks out the lush, rich vegetable garden.

I figured the total value of my summer of 2009 trial garden harvest was $746.52. In order to get a fair picture, I also needed to subtract the cost of seeds, plants, and compost (I can't make enough to keep up with my garden), which added up to $63.09. That leaves $683.43 in savings on fresh vegetables. Of course, prices vary throughout the season and throughout the country. I live in Northern California, and for comparison, Cathy, who lives in Iowa, checked out her prices and figured the same amount of organic produce in her area would be worth $975.18.

The Big Picture

I started this garden to see what impact millions of organically grown 100-square-foot gardens would have if they replaced the equivalent acreage of lawns in this country.

According to the Garden Writers Association, 76 million U.S. households gardened in 2013. If just half of them (38 million) planted a 100-square-foot garden, that would total 87,235 acres (about 136 square miles) no longer in lawns, and there'd be no need for the tremendous resources that go into keeping them manicured. If folks got even half of the yields I got, the national savings on groceries would be stupendous: about $26 billion! So, a 100-square-foot food garden can be a *big* win for anyone who creates one — and for our planet.

Looking Forward

I have decided to continue keeping the records from my 100-square-foot garden indefinitely. In the fall, I planted broccoli, chard, snap peas, cilantro, kale, scallions, and a stir-fry greens mix. This took much less time, as the soil preparation was done and the drip system was already in place.

Within a month, just 18 plants yielded 230 individual servings of salad!

The following summer, I planted different tomato varieties, added cucumbers, a tipi of pole beans, chard, and collards. Remember, I was growing all of this in a bed that is just 5-by-20 feet!

Read More, Share *Your* Results

My lecture audiences, the media and visiting gardeners are excited to report about how much food a garden can produce. Other organizations are on the same wavelength.

In spring of 2008, Burpee started to record harvest amounts, and Roger Doiron of Seed Money kept a tally of his family's summer garden (find an updated blog post at *www.SeedMoney.org/blog/whats-a-home-garden-worth*). To share *your* garden totals, contact us via email at Letters@MotherEarthNews.com. We're looking forward to hearing about harvests from folks all over the country.

ROSALIND CREASY (2)

GROW FREE FRUIT TREES

Grow your own delicious peaches, nectarines, and apricots from seed, and save!

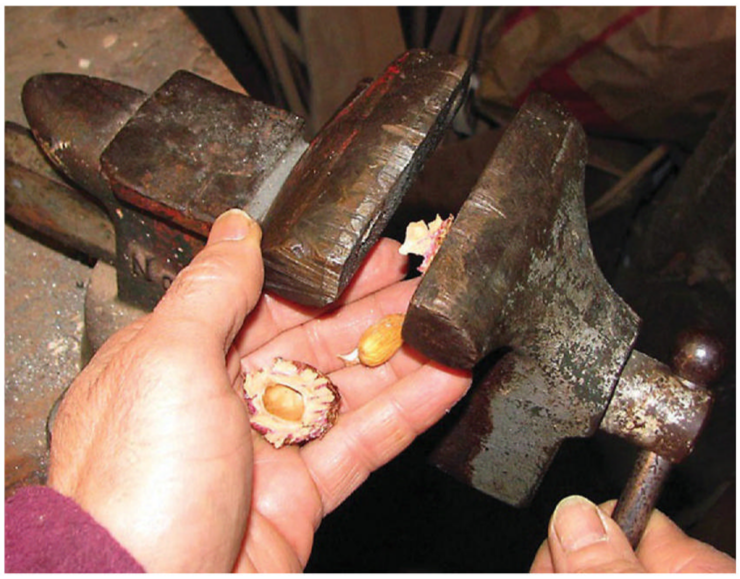
By Lee Reich

Most fruit trees are best grown from grafted trees that cost $25 to $35 each. But with peaches, nectarines, and apricots, you can cut your cost to zero by growing trees from seed.

Because cross-pollination between varieties produces variable results, apples and some other fruit trees are usually not grown from seed. (Instead, cuttings or buds of the best varieties are grafted onto rootstocks to produce trees that bear fruit just like the parent tree's.) But the almondlike seeds in pits from peaches, nectarines, and apricots do a good job of carrying on the desirable traits of their parents. You can simply sprout a seed from a great-tasting specimen, and you have a good chance of sinking your teeth into sweet, juicy fruit from your own tree in only 3 to 5 years.

Summer is the best time to kick off this project, because you can seek out mid- or late-season varieties grown in your region. The best seeds come from fully ripe fruit. Avoid seeds from early maturing varieties because their seeds may not develop enough to sprout. Locally grown varieties are more likely to prosper in your garden compared with varieties grown a thousand miles away, and looking

Try growing peach (left) and apricot (above, left and right) trees from seed: Just save the pits from fruits that taste most appealing to you. The best way to break the tough outer shell that houses the actual fruit seed is to use a vise (bottom right), nutcracker, or other similar tool.



CLOCKWISE FROM TOP LEFT: FOTOLIA/DUSAN KOSTIC; DREAMSTIME/MIRACLEMOMENTS; FOTOLIA/DAGOBERT1620; LEE REICH

for likely candidates is tasty fun! Eat lots of peaches from farmstands and farmers markets, and save the pits from those that taste like peach heaven. And if you live where you can get local apricots and nectarines, you can try growing them from seed, too.

Cracking the Pits

Let the pits dry on your kitchen counter for a few days. Drying allows the seed inside the shell to shrink slightly so it's easier to remove. The shell also becomes more brittle and easier to crack as it dries.

When the pits look and feel dry, crack them open to harvest the actual seeds, which look like almonds, a close botanical cousin. You can hold pits on edge and tap them with a hammer, which works well for a few pits but can result in high casualties of accidentally smashed seeds (and fingers). You'll lose far fewer seeds by cracking the pits with a vise, lodging both sides of the pit's long seams between the opposing jaws (see photo above). Crank the vise closed slowly—watch your fingers!—until the pit cracks.

If you don't have a vise, try a nutcracker. Or you might get enough pit-cracking compression from another type of screw clamp, including the one that holds your food grinder, juicer, or hand-cranked grain mill to your kitchen counter—you never know until you try! After you get the seeds out, put them in a closed container inside your refrigerator or find another cool place.

> Eat lots of peaches, and save the pits from those that taste like peach heaven.

Strategic Stratification

The timeline for vegetables and flowers to sprout from seeds and grow into transplants is measured in days or weeks, but with peaches and most other temperate-zone tree fruits, the pre-germination process adds 2 to 3 months to the timetable. Natural sprouting inhibitors present in the seeds must be deactivated by exposure to cool temperatures for a 2- to 3-month period. In nature, this chilling period occurs naturally as winter cold comes, fluctuates, and invariably leads to spring. You can simply plant peach, apricot, and nectarine seeds in pots and bury the pots in a corner of the garden. Seeds that are not discovered by marauding squirrels, curious dogs, or other vagaries of the great outdoors will probably sprout in spring.

To trick seeds into sprouting when you want (usually early spring), use a nursery method called "cool, moist stratification." Your refrigerator will make a perfectly satisfactory stratification chamber because ideal stratification temperatures range between 32 and 45 degrees Fahrenheit. To help your seedlings hit their best growing schedule, start the chilling period about four months before your last spring frost date. Varieties from warmer regions often require a shorter chilling period.

To start the stratification process, soak the seeds in room-temperature water overnight, then pop them into

> The better the growing conditions, the sooner your tree will bear fruit.

a jar of slightly moist potting soil. Close the jar and put it in your refrigerator — ideally in the door — where it won't get frozen or forgotten.

Begin checking the contents of the jar after about a month. It never ceases to amaze me how almost all the seeds sprout (as if a switch had been turned on) after they've spent enough time being cool and moist. Depending on the particular seed, that time might vary from 1 to 3 months (apricots take only 4 to 6 weeks), but after the chilling requirements for those particular seeds are satisfied, they're ready to grow. When you check the jars, the fat, white rootlets will stand out against the darker potting soil.

Now you have to do something with those young sprouts, which are eager to get on with the business of growing. If it's still freezing outdoors, keep the sprouting seeds in the refrigerator a bit longer. A month or so before your last frost date, either pot the sprouts or plant them where you want them to grow.

Keeping the seedlings in containers for a couple of months makes monitoring their progress easy. Waxed-paper milk cartons with drainage holes punched near the bottoms work well because when it's time to plant, you can merely cut away the cartons to minimize any root disturbance.

Growing On

The better the growing conditions, the sooner your tree will bear fruit. Good growing conditions for peaches and their kin mean fertile, well-drained soil with a near neutral pH. If you must plant where the soil tends to stay wet after rains, haul in some well-drained soil and build up a 3-foot-wide mound at least a foot high for each little plant. Mix in lime if a soil test shows the pH is lower than 6.0.

Pruning will delay bearing, so trim your seedling trees only to remove dead, diseased, or broken stems, as well as those that grow low on the trunk or are crowding others. Most seedling peach trees will grow to 20 feet or so, while apricots typically grow to 12 to 15 feet with annual pruning. Pay attention to weeds, water, and nutrition. An organic mulch such as compost, leaf mold, leaves, or straw goes a long way toward taking care of all three needs. Create a circle of mulch over the root zone that's a couple of inches deep and 3 feet or more in diameter. Keep the mulch a few inches from the trunk to avoid rot and rodent damage.

A better solution for keeping rodents at bay is to surround the trunk with a cylinder of quarter-inch mesh hardware cloth. Various insect borers can be deterred by wrapping the trunks with scraps of garden row cover to prevent the pests from laying eggs in bark crevices.

Peaches self-sow so easily that naturalized peach groves became extensive in the United States not long after peaches were introduced.

Early botanists assumed peaches were native to this part of the world, though their origin has since been traced to China. Sow a few peach pits around your homestead, and before you know it, you'll have lovely trees that cover themselves with beautiful pink blossoms every spring, and homegrown, tree-ripened summer fruits with flavor to die for.

To grow your own apricots, find tasty local varieties and plant their seeds.

FOTOLIA/PILIPPHOTO; PAGE 27: FOTOLIA/YEVGENIY11

Make Your Own POTTING SOIL

You can save money by using your own soil and compost to make potting mixes your plants will love.

By Barbara Pleasant
Illustrations by Elayne Sears

Packaged potting soils are a terrific convenience, but their cost adds up fast in a busy garden. Next year, when my pile of rotting sawdust matures, I hope to be potting soil self-sufficient—and save a bundle.

Potting soil self-sufficiency is not only good for your pocketbook, but for your plants and the planet, too, and you actually gain convenience by always having potting mix ready when you need it. If you have soil and compost, you've got the basic ingredients for making your own potting soil. In place of peat moss, perlite, and vermiculite (the three leading ingredients in bagged potting soil), you can simply combine your best soil with cured compost, leaf mold, rotted sawdust (from untreated wood), or a long list of other organic ingredients. Prepare some small batches, mix it with store-bought stuff to stretch your supply, and gradually make the transition to what potting soil should be—a simple, nurturing medium for growing healthy plants or starting seeds.

Giving Up Exotic Ingredients

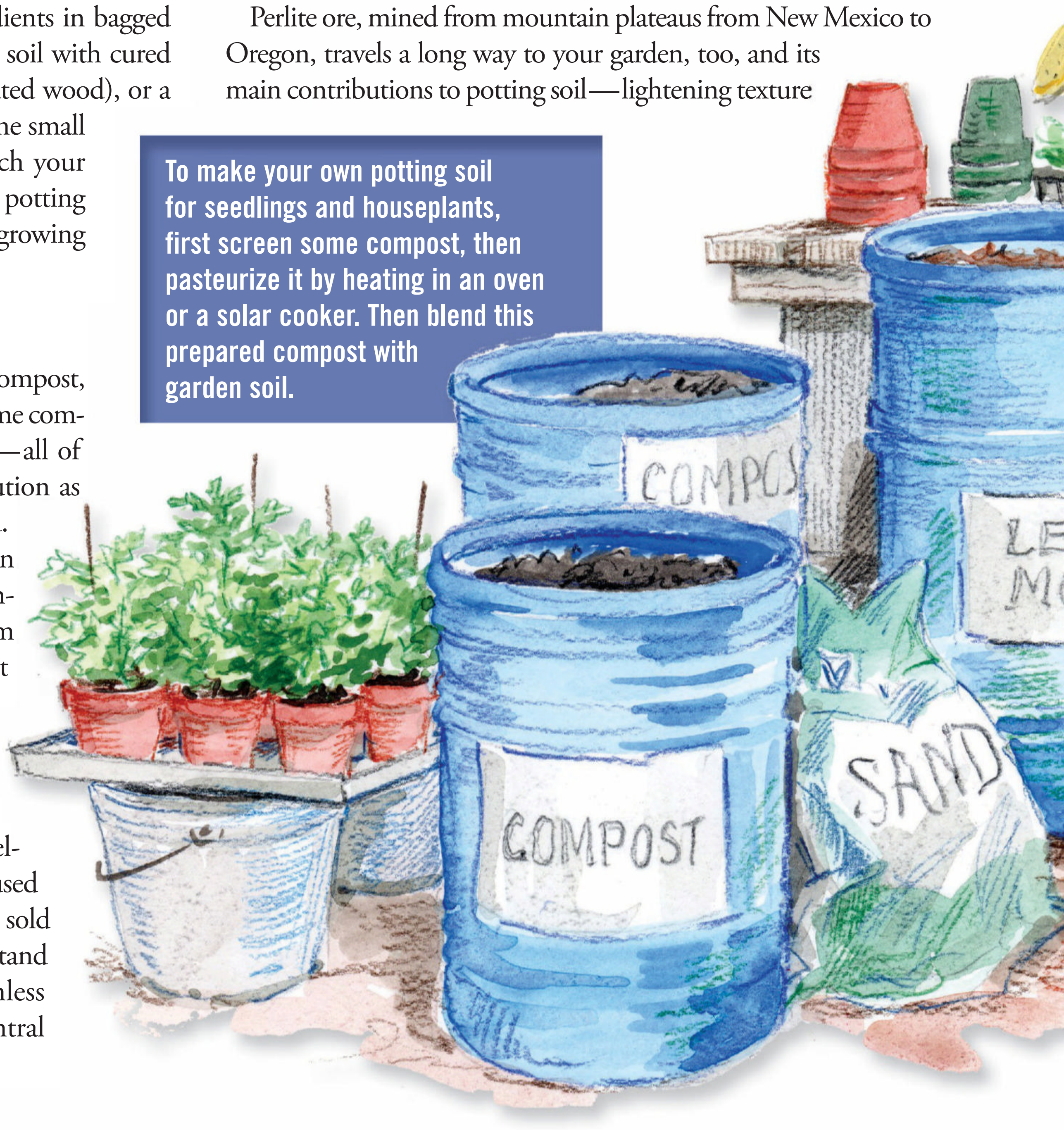
At least half of any homemade potting soil is compost, but most commercial potting soils are based on some combination of peat moss, perlite, and vermiculite—all of which contribute to land degradation and pollution as they are mined, processed, packaged, and shipped.

Peat moss is harvested from wetland bogs in Canada or Michigan, a practice that's not sustainable and probably takes place a long way from where you live (learn more about peat moss at *www.MotherEarthNews.com/Peat-Moss*). Many nurseries that grow woody shrubs and trees have found that composted tree bark or wood chips work beautifully as a peat moss substitute. In Walla Walla, Washington, Organix has developed a technology that turns the cow manure used in methane production into a peat-like material, sold as RePeet. Coconut husk fibers, called coir, will stand in for peat moss any day of the week, but unless you live where it's produced—in India or Central America—coir is about as exotic as you can get. For most of us, the best peat alternatives are leaf mold (rotted leaves), rotted sawdust, or a mixture of both. A 4-by-5-foot pile of chopped leaves will take about two years to decompose into leaf mold. In areas where organic rice or other grain hulls are available, composting them will create a light material for fluffing up potting soil.

Rotted sawdust, leaf mold, or the abundance of organic matter in compost made from garden waste can also compensate for the absence of vermiculite, a mined mineral with as many environmental issues as peat moss. Deposits in Montana and Virginia have been found to contain asbestos, leaving a small area of South Carolina as the lone remaining safe source in North America.

Perlite ore, mined from mountain plateaus from New Mexico to Oregon, travels a long way to your garden, too, and its main contributions to potting soil—lightening texture

To make your own potting soil for seedlings and houseplants, first screen some compost, then pasteurize it by heating in an oven or a solar cooker. Then blend this prepared compost with garden soil.



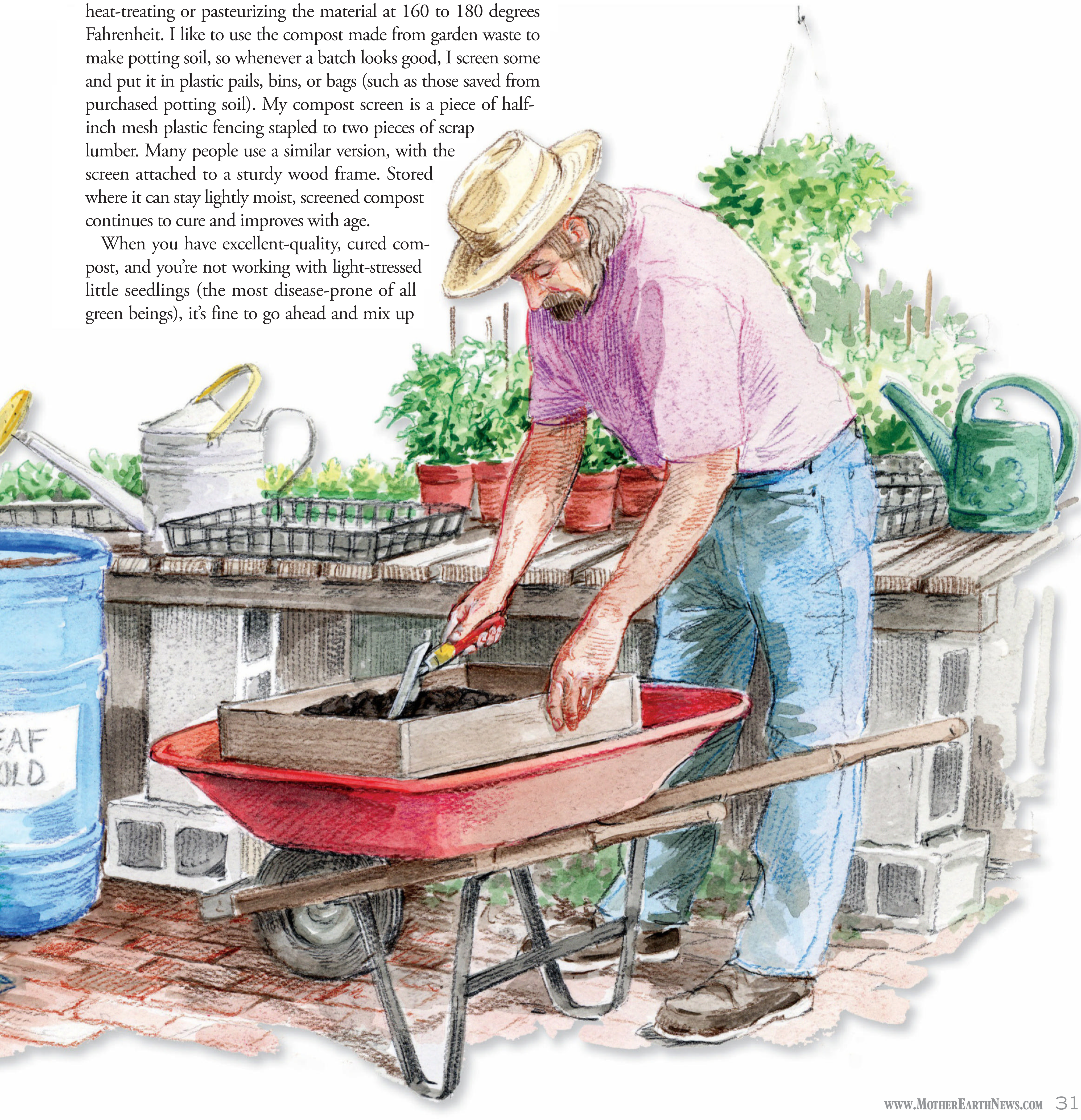
and improving drainage—can often be matched by clean sand. When you want a light mix, a handful of sand per quart will do the trick (you don't need much). As a hedge against slow drainage in the bottoms of seedling flats or containers, use a thin layer of rotted leaves, sawdust, or sand.

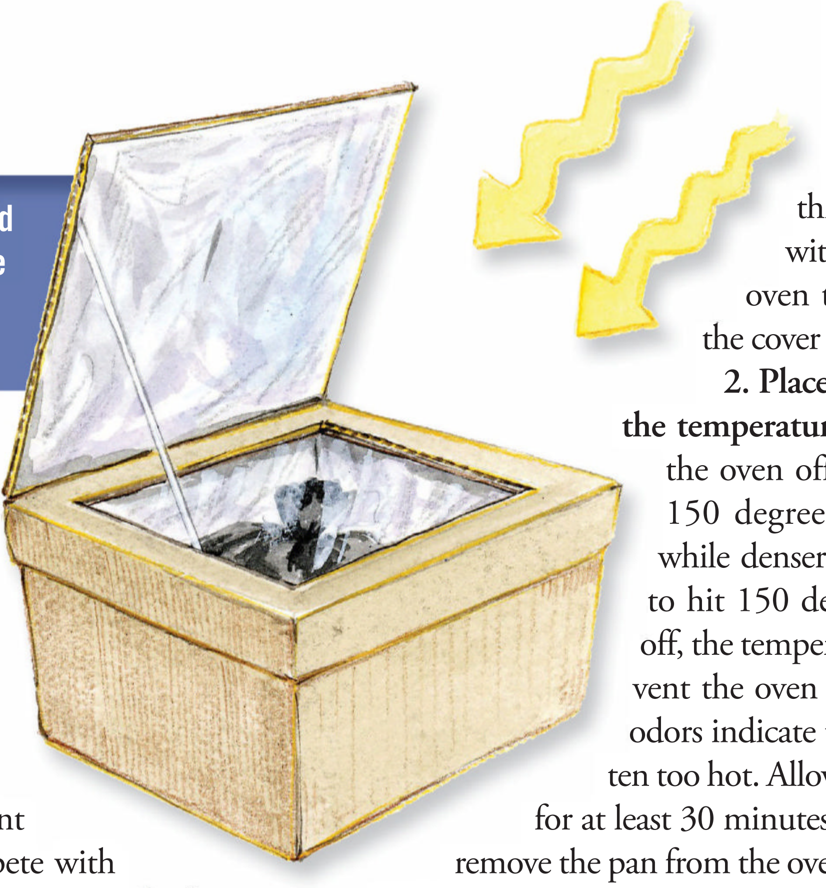
Taming Your Wild Compost

Using live compost or biologically active garden soil in your potting mixes often requires two extra steps—screening and then heat-treating or pasteurizing the material at 160 to 180 degrees Fahrenheit. I like to use the compost made from garden waste to make potting soil, so whenever a batch looks good, I screen some and put it in plastic pails, bins, or bags (such as those saved from purchased potting soil). My compost screen is a piece of half-inch mesh plastic fencing stapled to two pieces of scrap lumber. Many people use a similar version, with the screen attached to a sturdy wood frame. Stored where it can stay lightly moist, screened compost continues to cure and improves with age.

When you have excellent-quality, cured compost, and you're not working with light-stressed little seedlings (the most disease-prone of all green beings), it's fine to go ahead and mix up a 50:50 mixture of compost and good soil, and try it out. Or use more compost and less soil. My compost made from garden waste often contains quite a bit of soil already, mostly from the roots of pulled plants, so I often go with 3 parts compost to 1 part soil when potting plants that are ready for a rich, outdoorsy mix that gives them a nice taste of their future.

Now for the risks. The bioactive nature of compost makes it an ideal primary food source for your garden's soil food web, but teeming colonies of random fungi and bacteria are the last thing

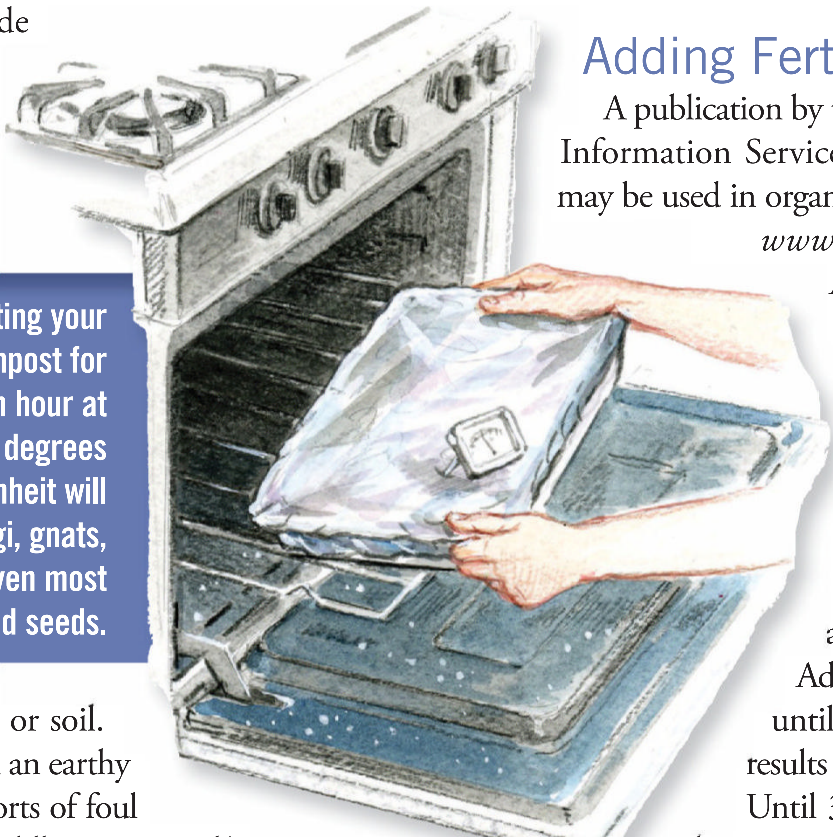




You can pasteurize your composted material in a solar cooker made from a cardboard box, aluminum foil, and plastic wrap.

you want in containers. Many of the microbes in compost specialize in breaking down dead plant matter, but if they are deprived of food they often find ways to invade live plant tissues. Good examples are the cadre of fungi that cause seedlings to rot off at the soil's surface, called "damping off." These fungi are usually present in compost, but when forced to compete with other microorganisms in open soil, they stick to a dead-plant diet. When let loose in a flat of tomatoes, with little or no appropriate food or competition, they will go after tender new roots and stems rather than starve.

Numerous studies have shown that pasteurization, which involves heating compost or soil to 160 degrees for an hour, or 180 degrees for 30 minutes, kills a high percentage of all fungi and bacteria (the good and the bad), while preserving the biological integrity of the material—and its ability to suppress other diseases. Pasteurization kills persistent insects such as fungus gnats, too, along with all but a few heat-resistant weed seeds. The temperature must not go above 190 degrees, which can result in the formation of compounds that hinder plant growth.



Heating your compost for an hour at 160 degrees Fahrenheit will kill fungi, gnats, and even most weed seeds.

In summer, a solar cooker made from a cardboard box will only take a few hours to heat a 3-gallon black plastic pot filled with soil and enclosed in a plastic bag. (Search for "solar cooker" at *www.MotherEarthNews.com* to find several articles on easy-to-build DIY models.)

The rest of the year, use your oven and a big heat-retaining Pyrex baking dish (mine came from a thrift store) to pasteurize compost or soil. When done correctly, you will smell an earthy aroma as the process unfolds. (Reports of foul odors from oven pasteurization are wildly exaggerated.) Here's the basic method:

1. Preheat the oven to 200 degrees. Place 3 to 4 quarts of screened, mature compost (or screened rich garden soil) in a bucket or pail, and mix in enough water to make it slightly moist. Spread the moistened material in a large metal or glass pan, but don't pack it down because steam needs to be able to circulate through the crevices. Cover tightly with aluminum foil. Poke a meat or oven thermometer into the center of the cover at a diagonal angle.

2. Place the pan in the oven, and check the temperature at 15 minute intervals. Turn the oven off when the thermometer shows 150 degrees. Compost heats up quickly, while denser soil can take up to 30 minutes to hit 150 degrees. After the oven is turned off, the temperature should rise to 170 degrees; vent the oven if it goes to 180 degrees. Sharp odors indicate that things in the oven have gotten too hot. Allow the pan to sit in the warm oven for at least 30 minutes. To free up the oven for dinner, remove the pan from the oven and wrap it snugly in dry towels. This is an optional step, but it will slow cooling, which makes for more thorough pasteurization.

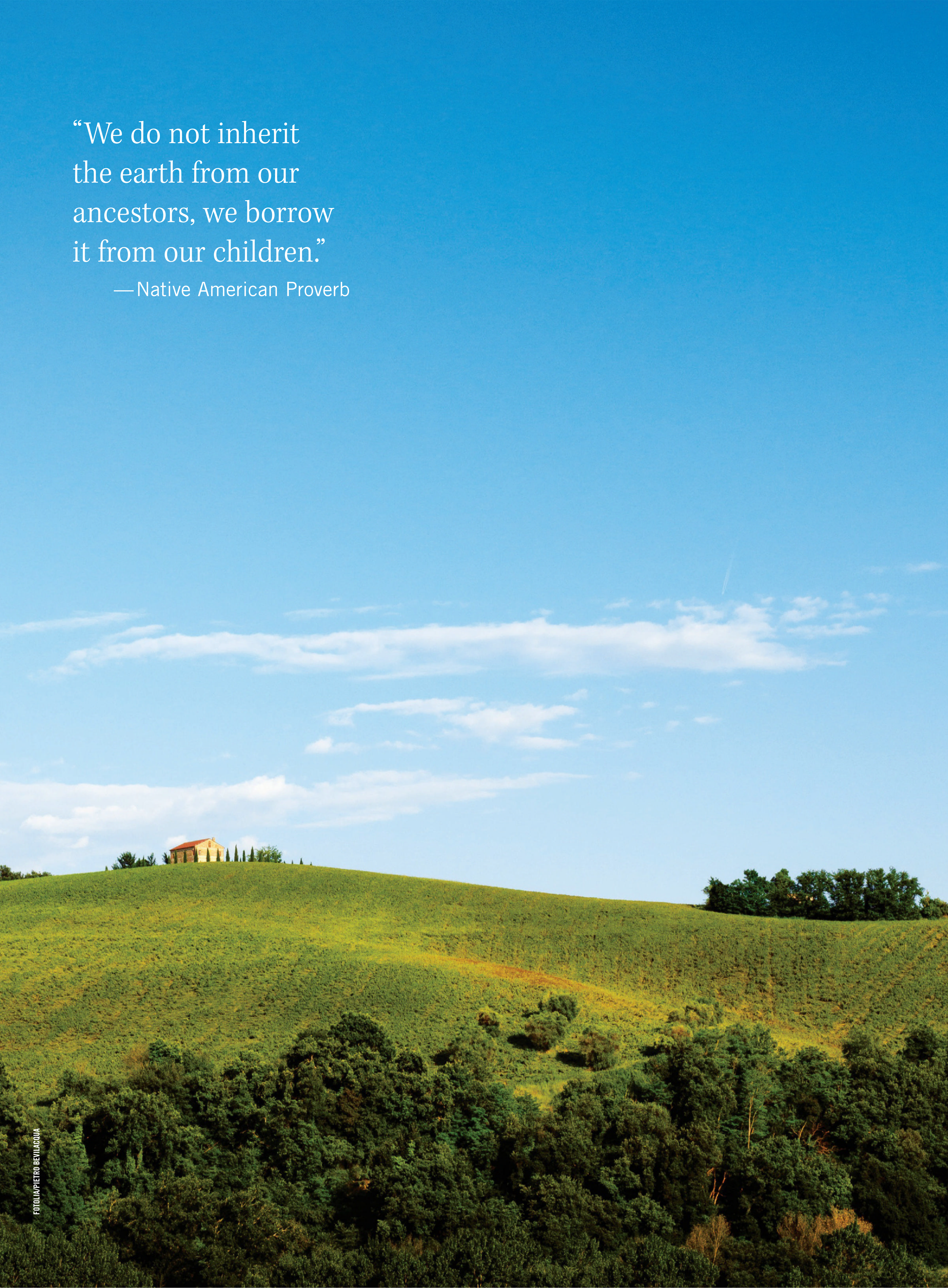
3. When the pan is cool, dump the pasteurized compost or soil into a clean container with a lid. Let it rest until you need it.

Germinating seeds, young seedlings, and plants being rooted from stem cuttings benefit greatly from a pasteurized mix, as do long-lived houseplants and trees that are seldom repotted. But you don't need to heat-treat compost-soil mixtures used for potting up plants that are almost ready to grow outdoors. In fact, I think switching to an unpasteurized, bioactive soil mix during the last "potting up" before transplanting reduces transplant shock, and there is no break in the growing action as they settle into their permanent home.

Adding Fertilizer

A publication by the National Sustainable Agriculture Information Service discusses many ingredients that may be used in organic potting mixes (available online at *www.MotherEarthNews.com/ATTRA-Mixes*). Some of those ingredients are bone meal (for phosphorus) and small amounts of kelp meal, greensand, or various rock-based minerals for minor nutrients. If your plants grow slowly or show other signs of nutrient stress, however, it's easy enough to feed them with a mix-with-water organic fertilizer. Add organic fertilizer in small amounts until your potting soil is giving you the results you want.

Until 30 years ago, most gardeners made their own potting soil by combining their best garden soil with rotted manure from the barn or buckets of leaf mold hauled home from damp stream banks, topped off with a dusting of wood ashes. Contrast and compare: North American gardeners now spend more than $500 million each year on potting mixes and specialty soils. How many of those dollars do you want to come from your wallet?



> “We do not inherit
> the earth from our
> ancestors, we borrow
> it from our children.”
>
> —Native American Proverb

FOTOLIA/PIETRO BEVILACQUA

Origino
B.C. Greenhouse
B.C. Greenhouse
CERTIFIED ORGANIC
tomato
FINEST ORGANICS IN THE WORLD

BUY IN BULK for Big Savings on Better Food

You can slash your family's food costs in half — and support local farmers — by buying meat, produce, and dry goods in bulk.

By Rebecca Martin
and Dan Sullivan

We all have a taste for good food, but quality groceries can come at a high price. Whet your appetite with this money-saving advice: Purchasing bulk food is a highly effective way to cut expenses and eat locally. You may already shop the bulk department of your co-op or grocery store, but cutting out the storefront altogether can offer even more financial, environmental and gastronomical benefits. Besides making your food shopping easier and less frequent, bulk groceries are often of higher quality than packaged supermarket products. And the money savings will wow you: See our chart on Page 37 for specific savings on 20 items.

If you choose to eat organic, the savings from buying in bulk can be even more staggering: A 2012 study by the Food Industry Leadership Center at Portland State University found that consumers saved an average of 89% compared with supermarket costs when they bought large quantities of certain organic foodstuffs, including grains, beans and spices.

Buying food in bulk may seem intimidating if you don't know beans about it. We'll walk you through the key steps of buying in bulk from local farmers and, for even greater savings on more items, joining a food-buying club.

Member Benefits

Buying clubs are groups of individuals and families who merge their grocery lists to buy food in big quantities at close-to-wholesale prices. Clubs make a collective purchase once or twice per month, usually through a single wholesaler, nabbing substantial savings on large-quantity purchases of everything from toothpaste to whole grains. As our chart shows, you can routinely save as much as 50%. Food-buying clubs also build community — members get to know each other while coordinating orders and volunteering time to divide the food.

Purchasing bulk food through a club

SARAH GILBERT; PAGE 35: TOP: DOUG SNODGRASS; BOTTOM, FROM LEFT: SARAH GILBERT (2); TERRY WILD

requires thoughtful planning. You'll need enough jars, bins, and tubs to pick up and store your portion of brown rice, wheat, nuts, and more. A chest freezer is a good investment to prevent large purchases of butter, meat, flour, and nuts from spoiling. Some clubs ask their members to chip in on shared freezers, a scale for dividing orders, and even a grain mill for grinding fresh flours.

Buying-club households usually waste less food because their cooking habits become grounded in a pantry mentality: Meal planning begins with the goods already stocked at home. Avoid purchasing unfamiliar foodstuffs until you're sure you'll eat them. Try a small package from the grocery store first, so you don't get stuck with a 10-pound bag of hull-intact buckwheat that needs to be ground twice to become a usable flour you end up not liking much. Keep track of what your family actually eats, too, and which foods linger on your pantry shelves despite your best culinary inventions.

Quality is guaranteed by us.
Buy as much
as little as you want

Your local co-op is still a good bet for smaller quantities of packaging-free dry goods.

Welcome to the Club

Hundreds of food-buying clubs are scattered all across North America. The staff at your local food co-op will probably be aware of any clubs in your area. If you can't find one nearby, cook one up by following these steps.

Recruit members. Many clubs have at least 20 members because some wholesale food distributors require minimum orders of $500 or more. The bigger the group, the greater the savings, because large orders lead to volume discounts and reduced shipping costs. You can recruit members from among your friends, relatives, and groups you're active in. Tack up a notice in the break room at work. Maybe schedule a brown-bag lunch meeting to discuss the benefits of buying in bulk and how a club might work. How often will you order? Will you limit the types of goods purchased? Can members share (or "split") cases and bags? If so, who will coordinate that step? When and where will your club take deliveries?

Select a vendor. You'll want to choose companies that don't limit their sales to commercial accounts when selecting a vendor for your club. See "Resources" on Page 38 for companies that sell to buying clubs, or contact an existing buying club for vendor recommendations.

You can also strengthen your area's food system by buying some items directly from local producers.

Set up an ordering strategy. The internet has made compiling orders more convenient than ever for food-buying clubs. You can place an order with a credit card, and schedule a drop date and location entirely online. A few national distributors use e-commerce software that tallies totals in real time as members add items to a club-specific shopping cart, making it easy to see when minimums are met.

Most food-buying clubs have one or

Consider how you'll store bulk food before you buy. Freezing fruits and vegetables (right) preserves their flavor and texture for up to 18 months.

two point persons who take the lead in sending reminders, placing orders, and scheduling distribution. Your club may decide to reward these individuals with a higher markdown. Distributors generally won't ship partial cases, so holding monthly meetings is a good way for members to decide on splits. The savings are huge on a 25-pound bag of organic black beans — more than $2 per pound when compared with a 1-pound package — but unless your family truly loves a lot of legumes, dividing that bag with at least one other household will make the purchase more feasible.

Secure a drop-off location. A club can receive bulk food shipments at a member's garage or possibly at a member's workplace. Someone will need to be present to accept the goods and check the delivery against the original order for mistakes and out-of-stock items. Keep in mind that delivery locations without refrigeration will limit your ordering options.

Develop a distribution scheme. The cheaper prices your club receives for bulk food are often subsidized by volunteers who split the orders — they open up the bags and weigh, package, and label the contents based on each member's order sheet. Distribution helpers should receive deeper discounts because they volunteer their time, or the job should rotate through the club so everyone takes a fair turn. Coordinating this splitting process may be more trouble than the savings are worth to your group. Some clubs forgo splits, so members must choose between smaller bags at a reduced discount or larger bags requiring proper long-term storage at home.

Pay the bills. Perhaps the busiest club member, the treasurer figures splits, sales taxes, and discounts, and ensures that all members pay their share. Some clubs rotate this task among members. Calculating splits is much easier when you use a spreadsheet, or you can register for the free club-specific software offered at *www.FoodClub.org*.

The bigger the buying club, the greater the savings: Large orders lead to volume discounts.

Food for Thought

Now that you've learned how to save money on food by starting your own buying club, you'll need some tips for keeping those volume purchases at optimal freshness and nutritional value until they end up on your plate. In addition to the following advice, "Save Money on Groceries" at *www.MotherEarthNews.com/Grocery-Savings* has more suggestions on storing sizable amounts of food.

Dry goods. Foodstuffs that don't contain liquid are among the easiest items to store. Distributors offer dry goods — sometimes including rare varieties of beans, rice, and grains — in bags weighing anywhere from 1 to 50 pounds. The savings can be substantial, particularly on large bags of organic dry goods: A 50-pound sack of wheat berries costs less than 50 cents per pound, for example, while a 5-pound bag of organic whole-wheat flour at the supermarket runs close to $2 per pound — four times more!

Store dry beans in an airtight container in a cool, dry environment away from direct sunlight, and they'll last well over a year. Nuts will keep in a refrigerator or freezer for up to two years.

Grains are a staple in almost every larder, but they're challenging for long-term storage because of meal moths, weevils, and other pests. One way to break the life cycle of weevils is to freeze grains for at least a week before storing them in a dry, dark environment at 60 degrees Fahrenheit or cooler. Grains can be stored in a freezer indefinitely. When freezer space isn't available, store grains in 5-gallon plastic buckets with tight lids. Two 5-gallon buckets will easily hold 50 pounds of wheat berries. The buckets stack nicely and can be picked up at low — sometimes even no — cost from bakeries and fast-food restaurants.

Produce. Mouthwatering, ripe produce is a lot cheaper if purchased in season from local growers. A bushel of

Buying in bulk reduces waste, especially when packing materials are reused (as they are in the Know Thy Food buying club in Portland, Oregon).

conventional green peppers costs about 80 cents per pound at a farmers market in August, while a handful of peppers will be priced at $2 per pound at a grocery store in February. True, freezing or canning all of that fresh produce will take some time, but the job won't seem onerous if you preserve small batches several times a week or organize a canning bee with friends.

Crops need to be matched with their preferred storage conditions, because some fruits and vegetables like cold and moist settings while others prefer warm and dry ones. Find detailed advice for storing 20 common vegetables and fruits at *www.MotherEarthNews.com/Food-Storage.*

The simplest way to squirrel away your stockpile of potatoes, carrots and other root crops is to keep them in the ground under a thick blanket of mulch, in a trench silo or pit beneath

Estimated Savings from Buying in Bulk

These estimates are averages of prices obtained from at least three vendors in January 2014.

Side of Beef	Direct-from-Farmer Price	Supermarket Price	Savings
Conventional	$3.97/lb.	$6.56/lb.	39%
Grass-fed	$6.64/lb.	$10.77/lb.	38%
Certified organic	$8.56/lb.	$13.34/lb.	36%

Beef costs were figured assuming a yield of 225 pounds per side, packaged as 30 lbs. of ground beef, 50 lbs. of chuck and arm roasts, 20 lbs. of rib roasts and rib-eye steaks, 17 lbs. of short loin strip steaks, 20 lbs. of sirloin steaks, 50 lbs. of round and rump roasts, 13 lbs. of brisket, and 25 lbs. of flank and skirt steaks and short ribs. This mix of cuts from a side can vary based on the instructions you provide to the butcher. "Direct-from-Farmer Price" estimates include butchering costs.

Dry Goods	Food-Buying Club Price	Supermarket Price	Savings
Rice, long-grain white, enriched	$0.50 (20-lb. bag)	$0.90 (5-lb. package)	44%
Rice, long-grain brown, organic	$1.17 (25-lb. bag)	$2.22 (2-lb. package)	47%
Pinto beans, dry, conventional	$0.88 (25-lb. bag)	$1.64 (1-lb. package)	46%
Pinto beans, dry, organic	$1.11 (25-lb. bag)	$2.49 (1-lb. package)	55%
Pinto beans, canned, conventional	$0.03 per oz. (108-oz. No. 10 can)	$0.05 per oz. (one 15.5-oz. can)	45%
Pinto beans, canned, organic	$0.09 per oz. (twelve 15-oz. cans)	$0.13 per oz. (one 15-oz. can)	35%
Unbleached flour, conventional	$0.56 (25-lb. bag)	$0.48 (5-lb. package)	-16%
Unbleached flour, organic	$0.73 (25-lb. bag)	$1.35 (5-lb. package)	46%
Peanuts, conventional	$1.05 (25-lb. bag, roasted in shell)	$1.90 (3-lb. package, in shell)	45%
Peanuts, organic	$2.78 (25-lb. bag, dry-roasted, shelled)	$6.49 (1-lb. package, dry-roasted, shelled)	57%
Potatoes, russet, conventional	$0.22 (50-lb. bag)	$0.51 (5-lb. bag)	57%
Potatoes, russet, organic	$0.76 (50-lb. bag)	$1.26 (5-lb. bag)	40%

All costs are per pound unless otherwise noted. "Food-Buying Club Price" estimates are based on bulk orders purchased from wholesale distributors in the quantities listed.

Fresh Produce	In-Season, from-Farmer Price	Supermarket Price	Savings
Tomatoes	$1.01/lb.	$2.94/lb.	66%
Green peppers	$0.84/lb.	$2.13/lb.	61%
Blackberries	$1.75/lb.	$5.18/lb.	66%
Apples	$0.49/lb.	$1.07/lb.	54%
Strawberries	$1.60/lb.	$2.28/lb.	30%

"In-Season, from-Farmer Price" estimates are for 25-pound quantities of conventional produce purchased in season at farmers markets or from pick-your-own operations.

SARAH GILBERT

PIKES PEAK ROAST
NOT FOR SALE

Jars, bins, and a chest freezer are wise investments for storing bulk food purchases. One cubic foot of freezer space holds about 35 pounds of meat.

a layer of soil, or inside a buried garbage can. Find instructions for making five easy outdoor root cellars at *www.MotherEarthNews.com/Root-Cellars*. (Turn to Page 60 for one DIY version.) Store winter squash and onions inside your garage, in a basement—even in a cool bedroom.

Canning is the traditional preservation method for most fruits and vegetables. To learn how to can, refer to the online Home Canning Guide at *www.MotherEarthNews.com/Canning*. Another way to lock in taste and nutrition is by blanching and freezing (check out "Freezing Vegetables from Your Garden" at *www.MotherEarthNews.com/Freezing-Veggies*). Most fruits and vegetables freeze well for up to 18 months.

Use energy from the sun to preserve fresh produce with a solar food dehydrator. Dehydrating with a solar (or electric) food dryer locks in peak flavor and nutrients while removing the moisture that causes fruits and vegetables to spoil. Store dried produce in jars or bags. Learn how to build a simple solar food dryer using cardboard boxes at *www.MotherEarthNews.com/Solar-Dryer* or for a sturdier version, find plans for our Best-Ever Solar Food Dehydrator at *www.MotherEarthNews.com/Solar-Food*.

Meat. The priciest line item in a non-vegetarian budget is usually meat. Buying beef and pork in bulk results in substantial savings, particularly on premium cuts. If you buy half a cow directly from a farmer, your take-home cuts can include roughly 17 pounds of strip and tenderloin steaks at about $3.97 per pound. The savings are more than 63% when compared with 17 pounds of the same cuts purchased from a conventional grocery store at $11 per pound. And that's just for conventional beef—don't miss reviewing the savings from buying grass-fed and organic meat in large quantity in the chart on Page 37.

Buying meat in volume is a great way to build relationships with local farmers, too. Ask a butcher—maybe one at a local food co-op—where to buy hormone-free pastured animals from a reputable producer, or locate names via the pastured producers listings for your state online at *www.AmericanGrassfed.org*, *www.Eatwild.com* and *www.LocalHarvest.org*.

Figure out how to store your portion of the animal before you buy. One cubic foot of freezer space holds 30 to 35 pounds of beef. After subtracting processing waste, a 1,000-pound cow yields about 450 pounds of meat from the whole animal, 225 pounds from a side (half a cow), or 110 pounds from a quarter. A 250-pound hog, slaughtered and dressed, produces about 144 pounds of cuts from the whole animal, or 72 pounds from a half.

Butchers and meat processors typically freeze cuts inside vacuum packs or wrapped in butcher paper. Freezing makes buying in bulk convenient, and fresh-frozen beef and pork are safe to eat indefinitely, although the quality begins to suffer after about six months to a year.

Now that you're stocked up with tips on how to save money on food, just remember: Plan your household's bulk purchases carefully, figure out how you'll store the food, and take pride in keeping your belly full for less.

RESOURCES

WHOLESALE DISTRIBUTORS SERVING BUYING CLUBS

www.AssocBuyers.com (Northeast)
www.AzureStandard.com (Entire U.S.)
www.CoopPartners.coop (Upper Midwest)
www.FrontierCoop.com (Entire U.S.)
www.GlobalOrganics.ws (Southeast)
www.HummingbirdWholesale.com (Pacific Northwest)
www.UNFI.com (Entire U.S.)

ORGANIC BULK FOODS

www.BobsRedMill.com
www.EdenFoods.com
Healthy Living Buyer's Club, www.HLBuyersClub.com
www.PleasantHillGrain.com

FIND LOCAL FARMERS

www.AmericanGrassfed.org
www.Eatwild.com
www.LocalHarvest.org
www.PickYourOwn.org
www.Facebook.com/MotherEarthNewsMag

BUY LOCAL! Connect with local producers via the Mother Earth News state and province Facebook pages (*www.Facebook.com/MotherEarthNewsMag*), Local Harvest's directory of producers (*www.LocalHarvest.org*), or your local farmers market.

LEFT: FOTOLIA/VLORZOR; RIGHT: HANNAH KINCAID

A pallet shelf and reclaimed barn wood lend this kitchen upcycled class.

65 Self-Reliance Tips That Will SAVE YOU MONEY

Apply a DIY approach to any facet of your life, and you can start saving big today.

By Kale Roberts

Throughout the years, Mother Earth News readers have proved to be a clever lot. You've shown time and again that you can save a bundle when you apply resourcefulness and a little elbow grease to home economics. Frankly, our consumer culture pressures many of us to live beyond our means. The good news is that making a personal and household commitment to a more frugal lifestyle can be a fulfilling, healthy choice—and the following tips to save money can start you on that journey. Imagine what your life will be like when you slash your grocery or utility bills in half, or when you're able to pay down your mortgage.

We've assembled the following tips from you, our readers, and from our Amazin' Archive—45 years' worth of helpful articles about living on less and loving it.

After you read our

Fresh eggs from backyard hens can cost less than $2 in feed per dozen, and buying staple foods in bulk eliminates marketing and packaging costs.

selections, find more details for how to implement the tips that interest you by going to the online, annotated version of this article at *www.MotherEarthNews.com/Save-Money*.

Shelter & Clothing

According to the U.S. Census Bureau, the average U.S. home built in 2012 was 2,505 square feet. For many families, that's much larger than necessary. Sizable homes are more expensive to build, heat, cool, and maintain. If you're able to reduce your home size to a cozier and more practical fit that still meets your needs, savings will follow. No matter the size of your house, here are ways to keep your construction, living, and maintenance costs down.

① Learn how to be your own plumber and electrician. Check out how-to books from the library, or invest in a class at a vocational school.

② Join or start a tool-lending library. Power tools are expensive and often only needed for a short time to complete a single project.

③ Build with salvaged materials or scrap materials reclaimed from construction sites. Visit Habitat for Humanity ReStores, search your nearest city's Craigslist posts, or check with the owners of demolition companies.

④ Barter construction labor with friends or neighbors.

⑤ If you're not ready to own a house, seek an arrangement to provide your labor in exchange for room and board. This is common on farms or in households in need of nanny services.

⑥ When shopping for land, save on a real estate agent's commission by browsing for homes listed for sale on the Internet, or talking with neighbors and landowners directly. You may even discover an owner willing to sell a plot that's never been listed.

⑦ Scour thrift stores and consignment shops for unique and affordable clothes.

⑧ Sew, knit or crochet your own clothes. At the least, sew on new buttons, darn socks, patch jeans, and learn how to repair other clothing you already own before buying new.

⑨ Forgo the cost of running a clothes dryer and instead string a clothesline in your yard or on a porch or patio. Put up a line in a greenhouse or sunroom in order to air-dry garments during cold or wet weather, or invest in fold-up clothes-drying racks for indoor use.

⑩ Organize a group clothing swap to trade your gently used threads for new-to-you apparel.

⑪ Cut your family members' hair yourself. A quality set of clippers will cost less than $50.

⑫ Make your own body care products (see Page 54). Most store-bought options can be replaced by some combo of just three ingredients: water, beeswax, and various edible and essential oils.

Food & Gardening

Hold on to your grocery and restaurant receipts for one month to track where your food dollars are going — you might be surprised by what you learn. Many North Americans spend nearly half of their food budget on restaurants and fast food. Avoid most of that expense by cooking at home: Home-cooked meals cost less, and you'll cultivate a closer relationship with your food because you'll know exactly what goes into it.

⑬ Prepare big batches of food on weekends and refrigerate or freeze leftovers for use throughout the week. Take your own lunch and snacks to work.

⑭ Forgo pricey coffee-shop lattes by drinking coffee at home and filling your to-go cup for the road.

⑮ Buy raw ingredients in bulk rather than prepackaged or prepared foods. Start or join a bulk food co-op and place orders directly with food companies to further cut costs.

⑯ Make your own food staples. For example, home-baked breads can cost about 50 cents per loaf, and home-

LEFT TO RIGHT: FOTOLIA/WAVEBREAKMEDIAMICRO; DOUG SNODGRASS; PAGE 41: ISTOCK/IVSTIV; PAGE 39: PHOTOSHOT/SIMON MCBRIDE/RED COVER

made cheeses cost about one-third of what you'd pay at the store.

⑰ Buy dry beans in bulk at a fraction of the cost of canned products, and pressure-cook them to save time. Pressure cooking also tenderizes inexpensive, tougher cuts of meat in a shorter span of time than conventional cooking requires.

⑱ Avoid supermarket prices by organizing a larder swap where you and your friends can trade dried, frozen, or canned goods or prepared meals.

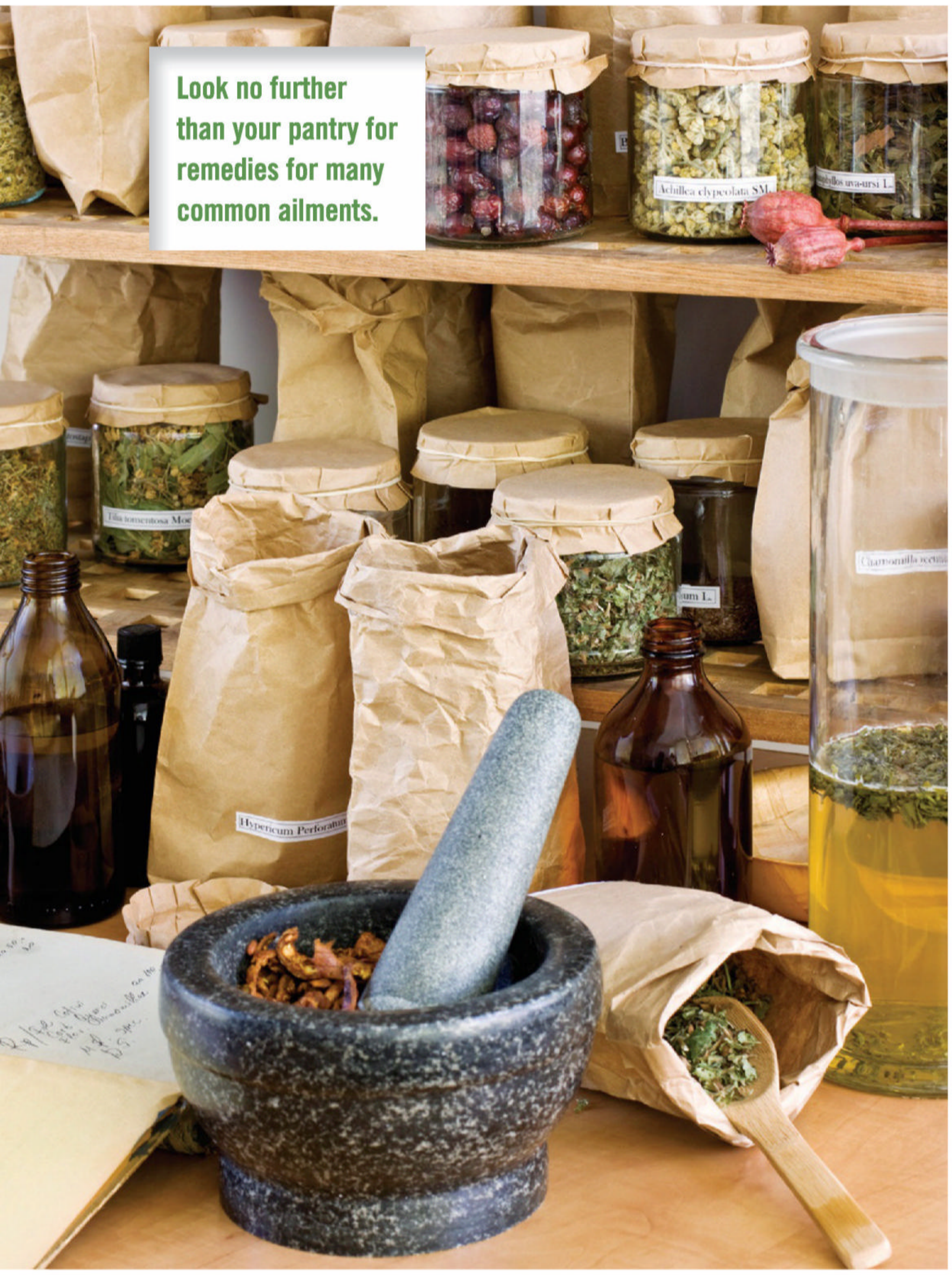
⑲ Purchase in-season fruits and vegetables at your farmers market and preserve them to eat year-round.

⑳ Cold frames, hoop houses, cloches, and other cold-weather gardening devices can help you stretch your home food production further into winter and start up again earlier in spring.

㉑ Commercial organic fertilizers tend to be overpriced. Instead, try using grass clippings from herbicide-free lawns — they contain about 2% to 5% free nitrogen.

㉒ Start vegetables from seeds rather than buying seedlings. Save seeds from your heartiest plants, and then attend (or organize) a seed swap to trade with other local gardeners.

㉓ Learn how to hunt and fish. Deer and other wild game will furnish your freezer with delicious, lean meat for the price of a hunting license and initial equipment purchases.



Look no further than your pantry for remedies for many common ailments.

㉔ Even in urban and suburban areas, ordinances often allow you to keep a few backyard chickens for egg or meat production. Super-fresh eggs from backyard hens will cost as little as $1.40 per dozen for feed, and you can raise meat birds for about $2 to $3 per pound.

㉕ Do you go through a lot of milk? Love cheese and yogurt? Keep a couple of goats or a home dairy cow, which can produce more than $3,000 worth of milk each year.

Family Health

Health-care spending in the United States averaged $12,914 per person in 2021 — close to a 54% increase from 2010. What herbalists and thrifty parents have known for millennia, however, is that matters of health can often be taken into your own hands for a fraction of the cost, especially when your goal is to *prevent* illness.

㉖ Turn the outdoors into your personal gym. Aerobic activity, coupled with a set of dumbbells you keep at home, can eliminate your need for a gym membership. Research shows that being in nature for even a few minutes at a time reduces stress hormones, which in turn boosts immunity.

㉗ Eating well may be the most enjoyable form of preventive medicine. Organic foods stock your body with nourishing nutrients and are free of toxic chemicals.

㉘ Grow medicine in your backyard! You can make many effective herbal remedies at home using kitchen equipment you likely already own.

㉙ Mental happiness translates to physical well-being. Find happiness in the stress-reducing aspects of simple living, and your body will be less prone to illness.

Home Energy

Take these steps to improve your home's energy performance, and you'll enjoy a triple win: lower utility bills, a smaller carbon footprint and a more comfortable home. Before investing in a solar- or wind-energy system, make your home as energy-efficient as possible. An efficient home requires less energy to run, meaning you'll be able to purchase a smaller, less expensive renewable energy system. To see calculations that outline just how quickly the measures below will pay off, look online at *www.MotherEarthNews.com/Energy-Savings*.

㉚ Plug your appliances into power strips, and flip the switch off when you're not using them. This will eliminate "phantom loads" from many appliances that continue to pull power when they're plugged in but not in use.

㉛ Adjust your computer's power-management settings so that it powers down into sleep or hibernate mode after several minutes of inactivity.

㉜ Replace inefficient incandescent light bulbs with light-emitting diode (LED) bulbs or compact fluorescent lamps (CFLs). The initial investment will pay for itself after one to three years, and the savings will continue for the remaining life of the bulb — up to 50,000 hours for a quality LED.

Let the sun do the work! Reduce energy costs by line-drying your clothes.

㉝ Rather than relying on air conditioning, open and close windows to regulate home temperature, and use fans to move air throughout your house.

㉞ If going AC-free is too challenging in your climate, set your thermostat at 70 degrees Fahrenheit or higher. For every degree you increase your thermostat, you will save 7% to 10% on cooling costs.

㉟ Paint your home—or, better yet, your roof!—a light color to decrease heat gain.

㊱ Wash your clothes in cold water. The friction—not the heat—performs most of the cleaning.

㊲ Replace your old fridge or freezer with an Energy Star model to save up to $1,000 on energy costs over the appliance's lifetime.

㊳ Seal and insulate heating ducts. The cost to insulate ducts is only about 25 cents per linear foot of ductwork, and unsealed ducts can lose up to 30% of heated air through cracks and openings.

㊴ Insulate your windows with transparent acrylic panels, insulative clear plastic, or bubble wrap secured to the interior of your window frames.

㊵ During cold weather, use a heated mattress pad to keep you warm while you sleep. Similarly, wear sweaters and layers, and use a small space heater in a room you can close off. You can then turn down your thermostat.

㊶ If you live in a suitable area and have access to a woodlot, heating your home with a woodstove can reduce your energy costs.

Transportation & Travel

Forty percent of all automobile trips are less than 2 miles. Walking these miles paves the way for you to save at the gas pump while reducing stress, fostering a greater connection to your environment, and getting in a workout. More than 60% of U.S. residents support increased federal funding for biking and walking, and ridership on public transit systems increased by 28% in 2019, while the U.S. population increased by 23%. Clearly, the first step to cutting transportation expenses should be the step you take away from your vehicle.

㊷ Ride a bicycle. Leave your car in the garage and consider an electric-assist bike for sweat-free commuting.

㊸ Take advantage of car-sharing or bike-sharing programs rather than owning and maintaining a vehicle.

㊹ Save all of your errands that require a vehicle for a single trip.

㊺ If you commute by car, set up a carpool with your co-workers to save fuel.

㊻ Learn how to change your own oil and perform other maintenance on your vehicle to avoid service fees.

㊼ When shopping for a car, buy the most fuel-efficient model that meets your needs. The difference between a 16-mpg model and a 14-mpg model, for instance, can reach $400 in fuel costs annually.

㊽ "Hypermiling" means adjusting your driving habits to save fuel, and these tactics can help you achieve up to 40% more miles per gallon. Drive slower on highways, brake less and accelerate smartly.

㊾ You can produce your own ethanol for an ongoing cost of less than $2 per gallon. Just 2 acres of corn can produce enough ethanol to drive 10,000 miles.

㊿ Alternatively, convert your diesel-powered car or truck to run on vegetable oil. You could even build a wood gasifier unit to run your pickup on waste wood from a sawmill.

(51) When flying, be flexible. Many airlines overbook flights and offer a free trip at a later time to those who are willing to give up their seats.

(52) Home swap so you can enjoy free lodging in a new location. Be sure to check out *www.AirBnB.com* to find homeowners willing to rent out their homes to travelers, or crash on someone's couch by connecting with hosts on *www.CouchSurfing.org*.

(53) Explore where you live. Plan a "staycation" to travel locally and discover something wonderful within a 50-mile radius of home.

(54) When renting a car or truck for a trip, choose a model

FOTOLIA/RAFAEL BEN-ARI; PAGE 43: FOTOLIA/MONKEY BUSINESS

Commute by bicycle to save money and make fitness a daily routine.

with fold-down seats and pack a sleeping bag. That way, your rented ride can double as instant, snug lodging.

Education

Rising tuition costs coupled with stories of college graduates unable to find work are discouraging to those hoping to further their own education or plan for their children. Meaningful education can come from a variety of avenues aside from expensive university courses, such as vocational trainings, skills workshops and community-based classes.

(55) For the college-bound, consider taking most course requirements at a community college, and then transferring your credits to a university to complete your degree.

(56) Attend an in-state, public university, which will subsidize residents' tuition. If you want to attend college out of state, first establish residency in that state to save big on tuition.

(57) Source used textbooks online, at a bookstore that sells used books, or directly from other students. Coordinate with students in your degree program early so you can swap books.

(58) Audit classes for which you want the knowledge but don't need the credits.

(59) Free video lectures on topics ranging from art history to economics can be viewed online at Khan Academy (learn more at *www.KhanAcademy.org*) and Academic Earth (go to *www.AcademicEarth.org*). Some universities, including Yale and Utah State, also offer open courses.

(60) Trade skills. If you play the piano, for instance, swap your musical training for a photography lesson.

Entertainment

Modern society has replaced creativity with consumption. We choose carry-out in place of preparing a home-cooked meal; we listen to music rather than making it. But as Shannon Hayes explains in her book *Radical Homemakers* (Left to Right Press, 2010), prepackaged pleasures pale in comparison with the joy that comes from fixing, making and tinkering with things. To be entertained isn't always a passive experience, nor is it wholly personal. Part of the pleasure of attending a community play, visiting an art museum or catching a Little League game is in sharing that time with others.

(61) Use free hot spots to avoid paying for Internet use. Some towns enjoy free, citywide wireless service.

(62) Ditch your TV, or at least your cable service. The average cable subscriber pays about $128 each month for service and associated fees — more than $1,500 per year. If you do watch TV, move your set to a less-used part of your house to discourage mindless viewing.

(63) For a night out without the kids, trade babysitting time with other families or join a babysitting co-op.

(64) Cities and towns offer a cultural smorgasbord of free and inexpensive events. Check online bulletins and local announcement boards for summer movies in the park, art gallery openings, benefit concerts and more.

(65) During the holidays, save a bundle on gift-giving by crafting handmade presents. If you do buy gifts, discuss with loved ones the possibility of setting a spending cap.

These tips are only the first steps toward financial freedom. We know you'll discover more ways to save, because when you tackle projects yourself and embrace the joys of simple living, your pocketbook — and your mind — will instantly reap the benefits.

RESOURCES

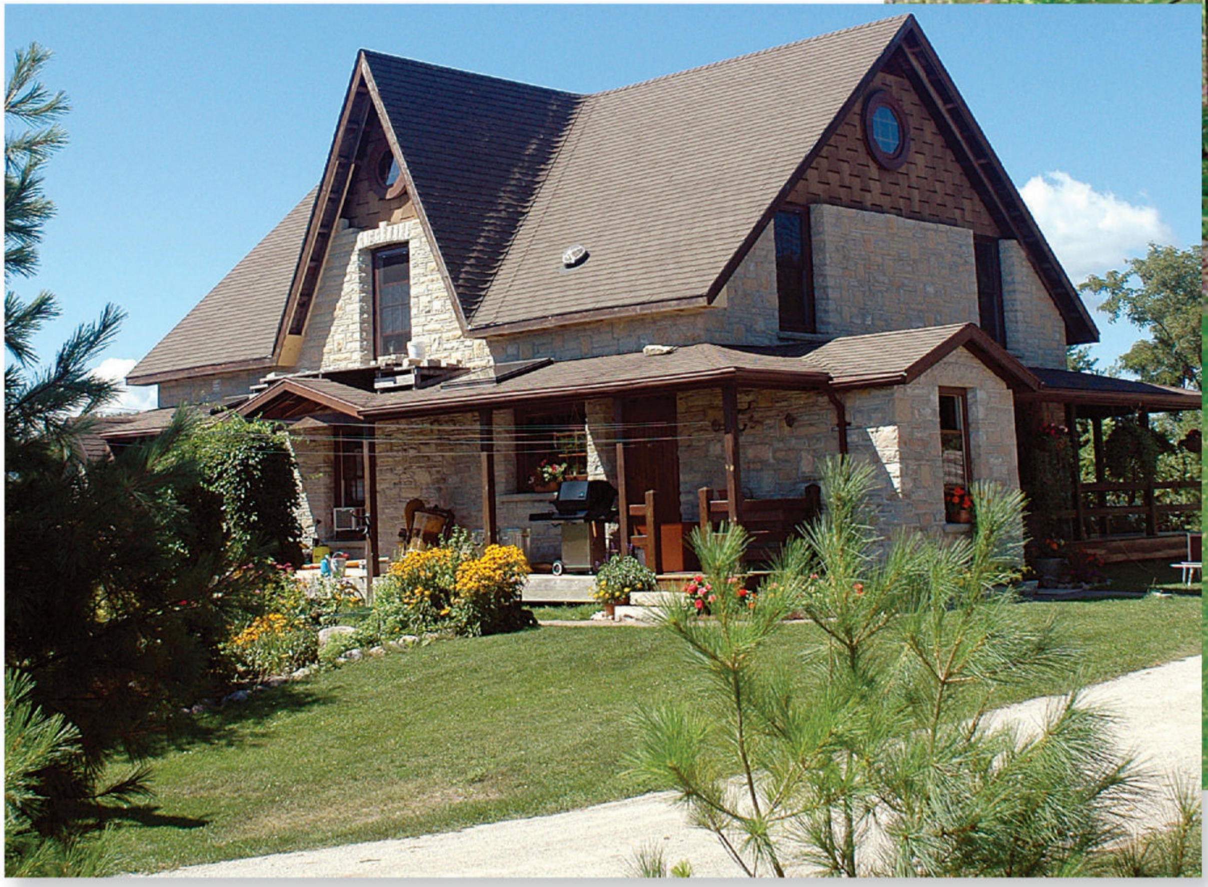
For DIY details on most of the tips in this article, go to the online version at *www.MotherEarthNews.com/Save-Money*. Order the books below at *Store.MotherEarthNews.com*.

Encyclopedia of Country Living by Carla Emery
Homegrown & Handmade by Deborah Niemann
52 Homestead Skills by Kimberlee Bastien
Self-Sufficiency: A Complete Guide by Abigail R. Gehring
Radical Homemakers by Shannon Hayes

A Handmade, DEBT-FREE HOME

Blend vision, patience, and perseverance, and you can build your dream home.

Article and photos
by Steve Maxwell



Steve and Mary Maxwell built their Victorian-style, handcrafted house for an out-of-pocket cost of $35 per square foot. Their family of six resides comfortably on Manitoulin Island in Ontario, Canada.

The scariest moment of my life came at 6:30 a.m. on Thursday, May 15, 1986. That was when I woke up in a wet tent, pitched next to a rusty, 18-year-old pickup truck, 500 miles from my boyhood home I'd just left for the first time in my life. While my buddies were jetting across the country building snazzy business careers around their brand new college degrees, I was sinking deeply into regret. How could the idea of building a no-compromise country house have seemed so compelling when I signed the deed? How could my dream turn so terrifying now that I was about to begin?

Later in the day, as I snipped through the rusty, tumbledown wire fence to make a driveway at the north end of my new 91½ acres, I felt a little better. Later that summer, when a foundation hole was dug, life seemed okay. And as I laid the first limestone blocks in the basement, I celebrated with a glass of sweet wine.

Five years later, on a cold, gray November day, I nailed down the final roof shingle—and life was good indeed.

Today, I wouldn't trade my house or country life for any number of fancy business careers. And now my dream home can be your dream home—I've worked with illustrator Len Churchill and Mother Earth News to create "study plans," which you can use to build something similar.

Welcome to the Maxwell House

On the quiet Ontario island of Manitoulin, at the end of a tree-lined gravel road, you'll find our three-story, Victorian-style, stone and timber house. The place looks old, but it's actually built entirely to modern standards. It's the most visible part of a lifelong work that my wife, Mary, and I began here in our early 20s. The vision we shared for our field-and-forest property has remained consistent ever since.

With no formal construction training other than a good high school shop program, we depended on research that involved lots of reading and observation. To get hands-on experience, I worked in cabinetmaking shops and construction

sites in Toronto (a seven-hour drive away) during the winters, while Mary worked on her nursing degree. Then we'd return to Manitoulin each spring from 1986 through 1991 to continue building while living frugally in the 10-by-20-foot wood frame shed we built for $550. (For more information, see "Build This Cozy Cabin" at *www.MotherEarthNews.com/Cozy-Cabin*.)

Beginning with a clean slate and an empty hay field, we aimed to design and build a place of beauty, peace, and permanence. The house is part of a work in progress for our land, but before I take you on a tour, you need to understand three important influences.

The first has to do with economy, both financial and environmental. We've always believed in spending wisely, avoiding debt and treading lightly on the planet. One of the reasons we chose to do all our own designing and building is because it allowed us to earn the money we needed as we went along. This slow road of self-reliant accomplishment also gave us time to plan carefully, addressing the real needs of our family in an environmentally reasonable way. When we were finished, we estimated our home's out-of-pocket cost to build was $35 per square foot.

The second driving force is our commitment to aesthetics. We go further than most in our quest to create the right "feel" for our place. The 24-inch-thick stone walls of the basement, the hand-carved wood trim, and the 150-foot wrap-around veranda may seem extravagant to some — but that's okay. To us, the thrill of experiencing the structure of enduring beauty we've created is well worth the effort.

The last point has to do with our motivation. We never made a single home-building decision based on how lucrative it will be, because we never intend to sell this place. After you establish that standard, priorities shift from expedience to quality.

Dream Home by Design

We developed plans for our house using graph paper, a scale model, and an engineering span table to determine the sizes of load-bearing frame members. All exterior walls are made of 2-by-6 stud framing with exposed posts and beams inside. In addition to the fiberglass

Features at a Glance

2,500 square feet on three aboveground floors

34-by-44-foot footprint, plus 6½-foot veranda all around

2-by-6 stud frame exterior walls, insulated with fiberglass batts and 1½ inches extruded polystyrene foam applied to the face

24-inch-thick, hand-cut limestone basement built on bedrock marked with glacial striations

Exposed, locally harvested pine timbers in kitchen, living room, and second-floor family space

Four bedrooms, two full bathrooms with low-flow toilets

1,000-gallon septic system

Artist's loft on the third floor

Limestone masonry heater

Locally quarried limestone exterior facing

Out-of-pocket costs to build: about $35 per square foot

insulation between the studs, we applied an exterior layer of 1½-inch-thick extruded polystyrene foam to the outside face of the structure. This unbroken layer of insulation boosts thermal performance considerably compared with stud-only designs. We also installed interlocking asphalt shingles on the walls as a temporary sheathing to protect against the elements while we completed the home's exterior, made from locally quarried limestone.

The hand-cut limestone foundation walls sit on ultra-smooth bedrock, with scratch marks cut by glaciers (called "striations") still plainly visible today.

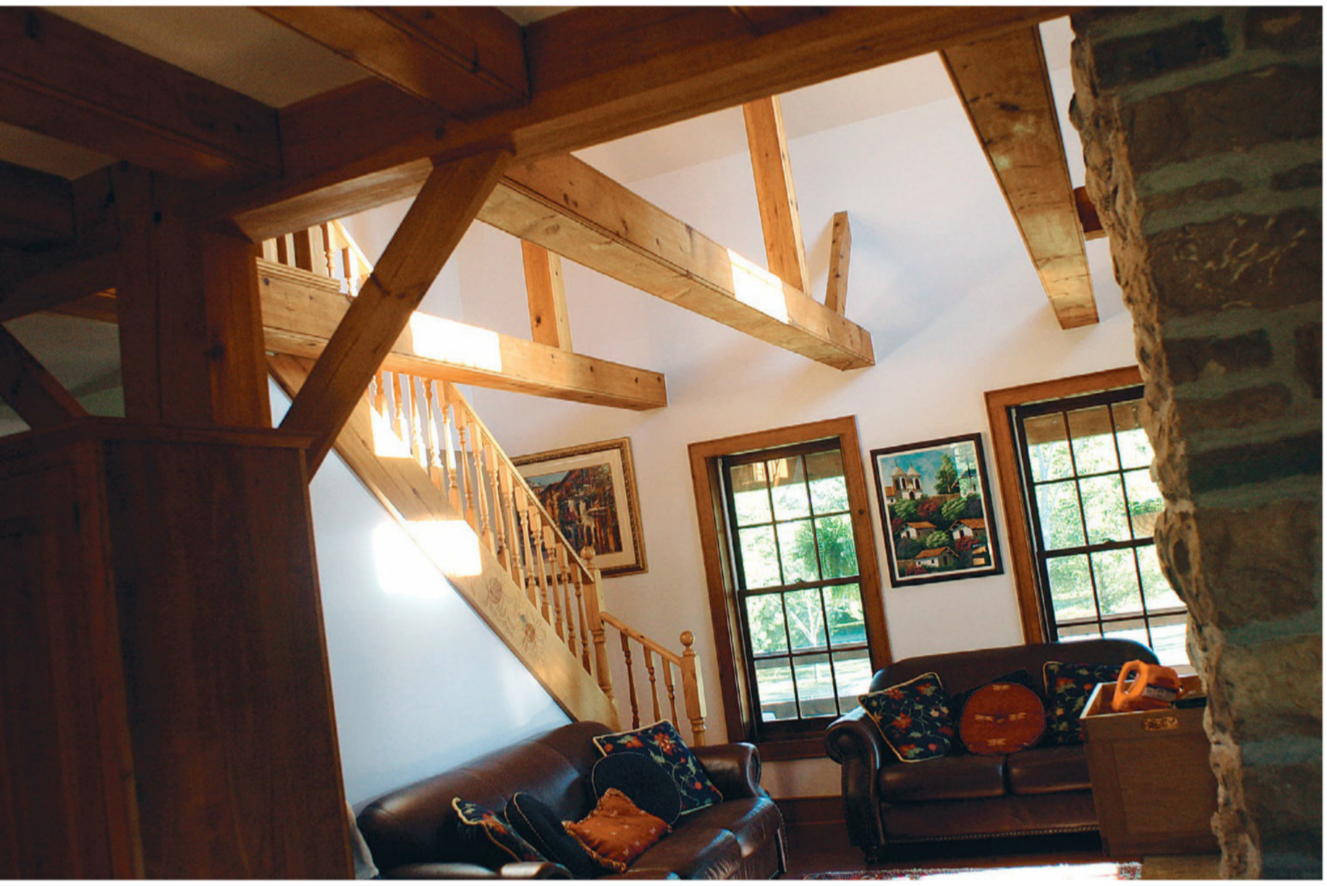
The roof is steep, and framed with rafters in a traditional style, creating an open third-story loft that's useful year-round. Ventilated rafter channels keep airflow moving from eaves to peak while preserving space for insulation.

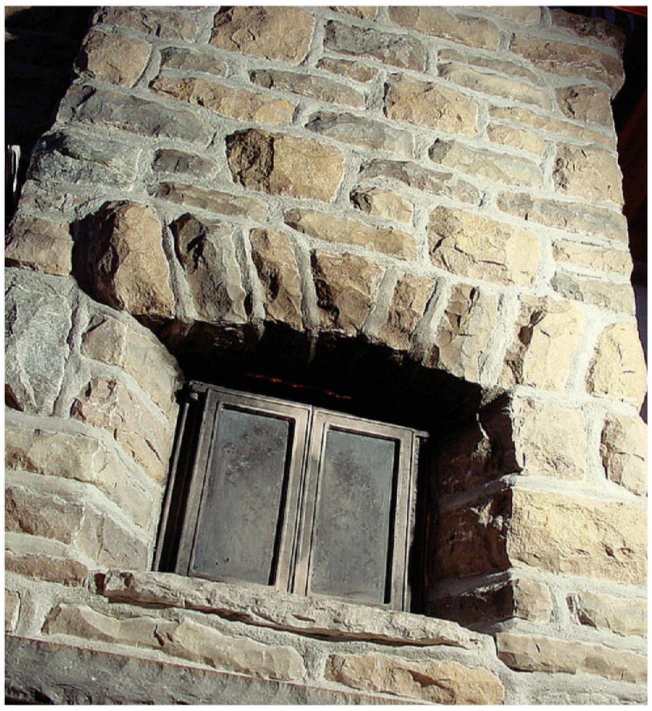
The prospect of a wrap-around veranda seemed so daunting we almost abandoned our plans for it, but that would have been a big mistake. Even though it's only 6½ feet wide, the effect of this feature makes a lot of practical and aesthetic sense. If you were ever to visit us, sitting on a deck chair reading a good book during a gentle July rain, you'd see exactly what I mean. The veranda roof also provides plenty of cool shade for our kids, a sheltered place for shade-loving hanging plants, and considerable protection for windows and doors. In addition, the deck finish lasts longer thanks to the overhang of the roof. Quality dwells in the details, and this philosophy extends to our veranda. Though we built it with standard construction-grade lumber, routed edge details transform the wood in surprising ways.

One of the most useful features of our home is the extra-wide outside entrance to the basement (see photo, Page 47). It's part of the traditional limestone wall that forms the foundation, though the entrance could be built in a more conventional way that matches whatever style of basement you want. Regardless of how you build it, the 48-inch-wide doorway is great. It's large enough to allow produce, firewood, and large tools to be moved in and out of the basement as needed.

Mary and I love wood, so I've used it wherever possible inside without overdoing it. The floors are locally cut and milled white pine, finished to a cinnamon-brown color. We've also used the same wood and finishing strategy for kitchen cabinets, bathroom wainscoting, and built-in storage areas.

We crafted almost every feature of this house ourselves, even the exterior doors. The 3-inch-thick insulated wooden "warm doors" (see photo, Page 47) I designed are one feature I strongly recommend for people who want to move beyond the ordinary and reduce heat loss. My design includes three layers: a 1-inch-thick interior pine frame sheathed in narrow tongue-and-groove pine on interior and exterior faces. I cut pieces of rigid foam to fit within spaces in the central frame, caulking the joints between pieces of tongue-and-groove wood as they were installed with hidden nails and construction adhesive.





About one-fifth of the second floor is open to the cathedral ceiling (left). The stone mass of the masonry heater accumulates heat and transfers it slowly to the house (right).

Hand-carved designs incorporated throughout the house add visual interest, character, and value.

For most of the years we've lived in our house, we've heated it using about a dozen cords of wind-fallen poplar and other softwood each year. We burn it in a masonry heater (see photo, Page 46), which makes all the difference. This is an age-old technology that burns wood quickly and with very little smoke at temperatures approaching 2,000 degrees Fahrenheit. Heat from the combustion gases transfers to the surrounding 5,000 pounds of refractory mortar and limestone that make up the heater. As the gases pass through 13 feet of internal passageways before entering the base of the chimney, the stone picks up heat. The accumulated energy then transfers slowly to the house after the fire is completely burned out and the flue closed. Combustion is clean, safe and short-lived. During the last three years, extra building projects have prevented me from cutting our own firewood, so we've switched temporarily to a pellet stove. We burn about 3 tons of pellets from mid-October to mid-May. Pellets cost about the same as firewood, but handling bags of pellets is easier and quicker than lugging stacked logs.

We could've enjoyed more living space in our design, but we opted to devote about one-fifth of the second floor area to an open cathedral ceiling space above the living room (see photo, Page 46). Light, space and a chance to expose some beautiful white pine timbers are the reasons we recommend this approach. This also allows the wooden stair stringers to be showcased in a way that wouldn't have the same impact otherwise.

The importance of trim and architectural woodwork is often overlooked because their additions come near the end of the building process. Owners are often eager to move in at this stage, with budgets running tight. But skipping this step is a risk because trim exerts some of the most powerful influences on the atmosphere of a house. We milled all our own molding and wainscoting from inexpensive, locally cut pine routed to simple, classic profiles for a beautiful effect.

Built New to Look Old

One of the best compliments we receive about our home comes in the form of a question that visitors often ask as they step into our yard for the first time: "Is this a historic home that you've renovated?" Even professional builders sometimes wonder, and the reason is the stonework.

We laid a 9-inch-thick layer of hand-squared, limestone blocks to form the exterior surfaces of the stud frame walls using local materials we gathered ourselves. It takes months of work to complete the same amount of wall you could cover in a day with vinyl siding, but we wouldn't consider anything other than stone. Besides, if

The author's son, Joseph, welcomes you inside through the three-layer, insulated "warm door" (left). The 48-inch-wide outside entrance allows produce, firewood, and large tools to be carried in and out of the lower level with ease (right).

Katherine Maxwell enjoys a sunny spot in a hammock on the wrap-around veranda. The Maxwell family loves using their veranda—it's a great place to sit, relax, and enjoy the outdoors, while still being protected from the elements.

We aimed to design and build a place of beauty, peace, and permanence.

you consider the amount of maintenance required by a finished, wooden exterior over the course of a lifetime, hand-quarried stone isn't any more work.

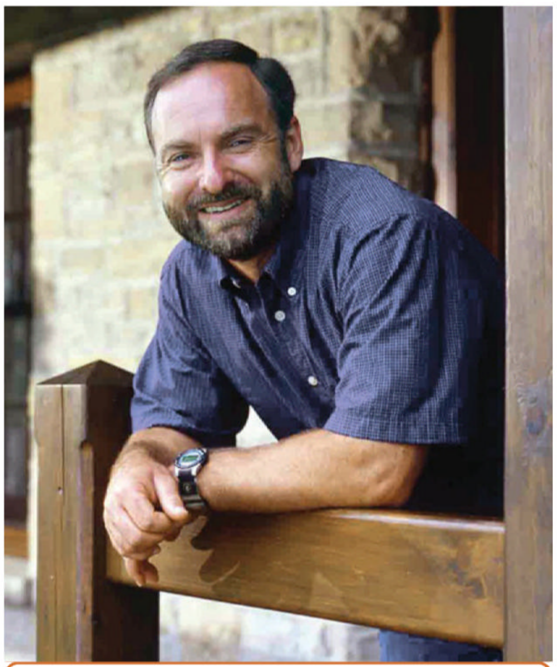
Things We Might Change

We'd change only a few things about our design, and a couple are worth mentioning. The open-concept living space created by the cathedral ceiling in the downstairs living room looks terrific, but when we created our design back in the mid-1980s, we didn't realize just how noisy a houseful of kids could be. So if you'd like to reduce sounds traveling from upstairs down into the kitchen, you might consider closing in the cathedral space and gaining another 200 square feet of floor area in the bargain.

Another thing you should consider is the orientation of the house relative to the sun. Our future plans include enclosing the south side of the veranda with windows to capture solar heat. We realized too late that having our bedrooms facing west means we miss glorious morning light. East-facing bedrooms are definitely worth the trouble, even if it means flipping the floor plan around end-for-end to make it happen.

I laid the first limestone block of the basement foundation on July 4, 1987, and the house was livable and comfortable by the spring of 1991. I was still building in 2007 (finishing a four-season attic loft and completing exterior stonework). This sounds like an awfully long time, but we've never had a mortgage looming over our heads, thanks to modest help from family and the ability to live rent-free with my grandfather during the winter months as we worked for the funds necessary to continue construction.

Building your own house is a big commitment, but don't be discouraged. If you give yourself time and keep working, the results are definitely worth it. And always remember that consistent hard work and a vision worth sweating for can prevail against whatever challenges you encounter.

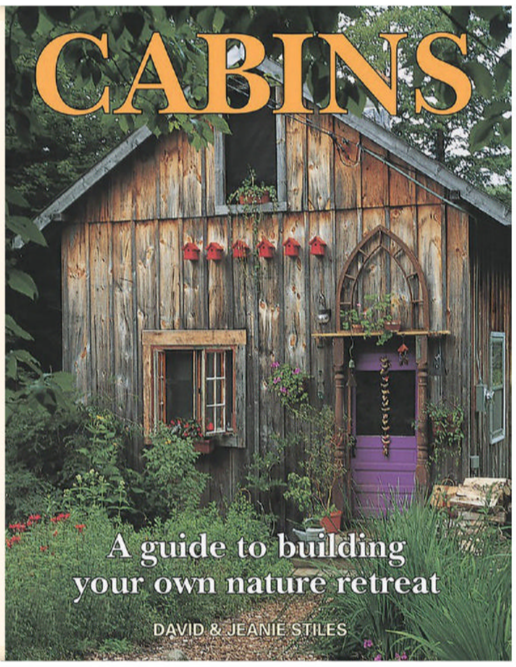


Contributing Editor Steve Maxwell writes many of our do-it-yourself articles, such as "Build this Cozy Cabin" and "A Blueprint for Better Building." You can read all Steve's previous MOTHER EARTH NEWS articles by searching for his name at *www.MotherEarthNews.com.*

Build Your Own Nature Retreat!

By David Stiles and Jeanie Stiles, *Cabins: A Guide to Building Your Own Nature Retreat* will help you discover essential information on log cabins, and it includes everything you need to buy land, develop plans, and learn construction methods. All with full-color photographs, clear illustrations and descriptions, and exploded diagrams to give you the details you need for a successful project. Find a list of questions to consider during the planning phase; discover different types of construction; learn about prepping the site, sourcing windows and doors, installing insulation, adding the roof, electricity, water, and heating; look at a number of cabin designs with their advantages; and consider your furnishings and accessories. Plans include line drawings and precise plans with measurements.

To order: Call 800-234-3368 and ask for item #11140, or visit *Store.MotherEarthNews.com*. Use promo code MMEPANZ3.



LEN CHURCHILL; ABOVE: ROGER YIP

> “We have to walk in a way that we only print peace and serenity on the Earth. Walk as if you are kissing the Earth with your feet.”
>
> —Thích Nhât Hanh

A COMMUNITY GARDEN: FOTOLIA/BGSMITH

Build a Home for $10,000 IN 10 DAYS!

With this easy, low-cost round-timber technique, you can do it.

By Chris McClellan

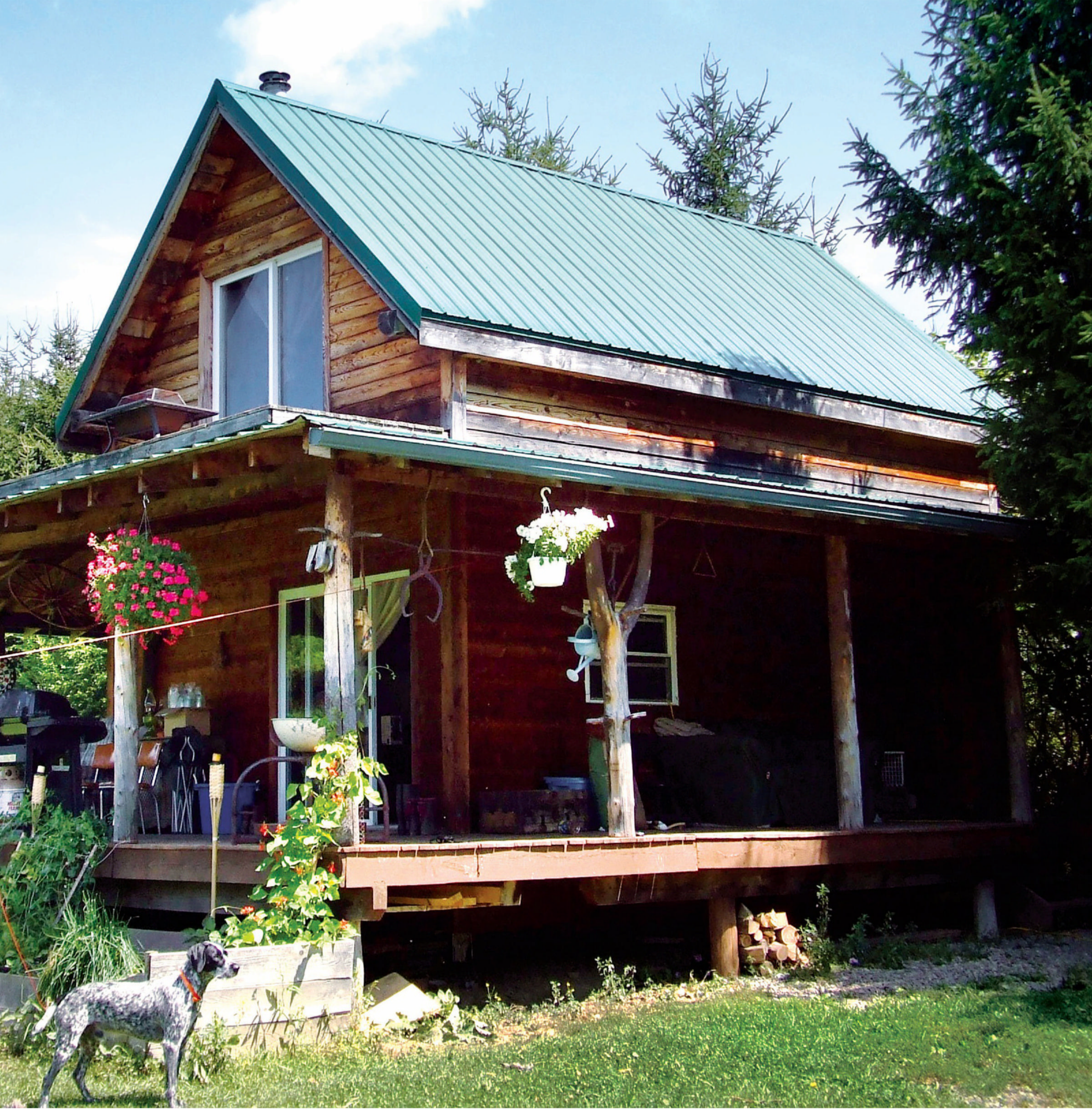
For half a century, William Castle has been building bridges, cabins, and shanties of all shapes and sizes. His favorite projects are right in his own yard. Woodland areas, such as those in his native Belmont, New York, often have an abundance of "junk" timber that has little commercial value because of its small diameter, twisted grain or other imperfections. The modified timber-framing method Bill has developed lets him quickly and easily turn this low-cost, local resource into beautiful houses, such as his daughter's cabin (above, right). The shell of the 1,000-square-foot house was built atop an existing foundation by a crew of three to four adults and two children in fewer than 10 days—for less than $10,000! *(These calculations were made when this article first appeared in print in 2009.—Mother)*

If You Build It …

More than 30 years ago, Pollywogg Hollër, as Bill and Barb Castle call their 30 forest-encircled acres, began as a project to bring the family together. Bill had his own bridge-building company, a seven-day-a-week work ethic, and almost no connection to his growing children.

At Barb's insistence, Bill began taking time off, and over the course of three summers, they and their three teenage children built a 20-by-30-foot log cabin in their back woods. They dug the well and foundation by hand, dragged logs out of the woods with an old tractor, peeled the logs with a drawknife, and placed them with the help of a homemade crane.

CHRIS MCCLELLAN (2)



The shell of this modified timber frame house was built in 10 days. The log cabin at left was a family project undertaken more than 30 years ago.

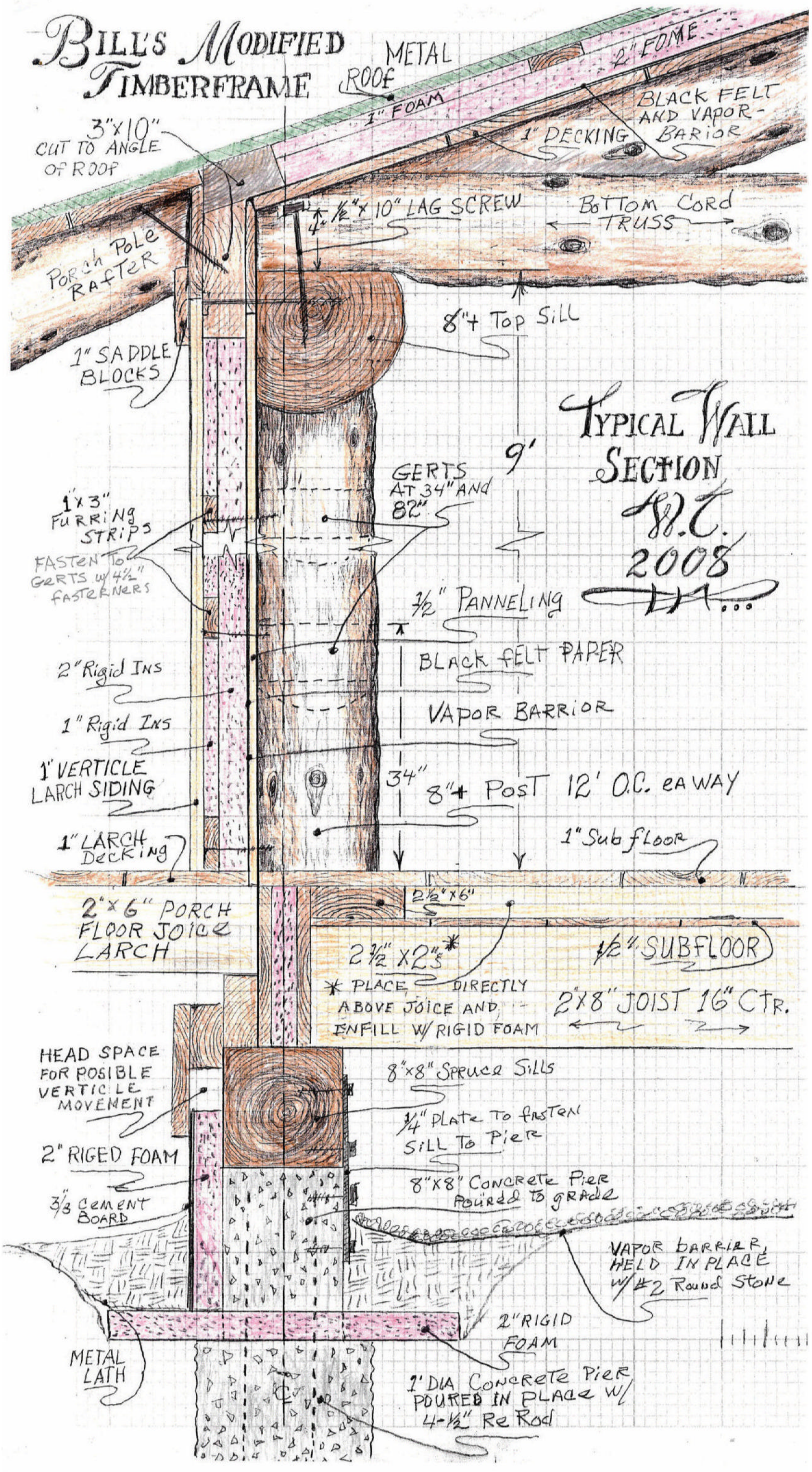
Other than mortar, hardware, and roofing, all the materials in that cabin came from the land. Over time it became their home. Now, it's a rustic bed-and-breakfast "eco-retreat" (see *www.PollywoggHoller.com*) that the Castles run with their son Mikael — complete with solar power, a sauna, a bathhouse, a picnic pavilion, a wine bar, and a wood-fired pizza oven. There's even a stage for weddings and concerts. Most importantly, building the cabin brought their family together.

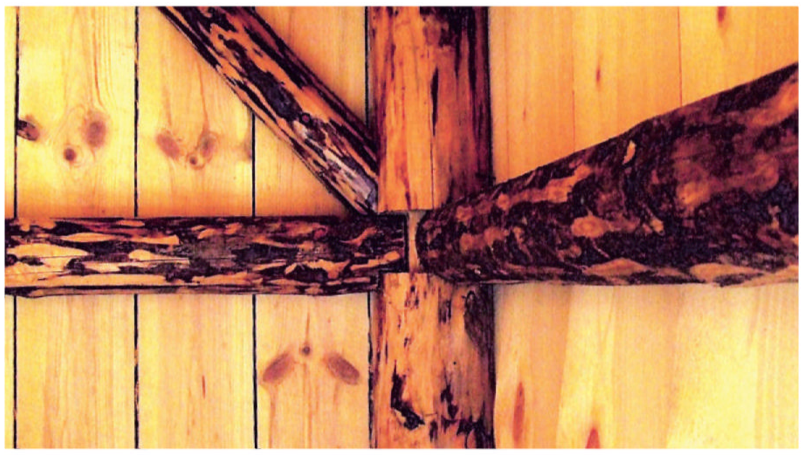
As we walk through the enchanted village the Castles have built, Bill points out the different local woods and the uses he puts them to: There are footbridges of larch (aka tamarack), which he calls "the poor man's cedar." Fence posts are rot-resistant black locust. Hemlock is used for sheathing, red oak for floors, and fir for log cabin walls.

Bill has used cedar for roof shakes in the past, but sustainably harvested cedar is getting harder to find at any price. He prefers to build low-maintenance metal roofs or "living roofs" with a rubber membrane covered with moss and wildflowers.

A Simpler Timber-Framing Technique

Bill's timber frame building technique has evolved to allow him to do more with less. Hand-building a log cabin


BILL'S MODIFIED TIMBERFRAME
METAL ROOF
2" FOME
1" FOAM
BLACK FELT AND VAPOR-BARIOR
1" DECKING
3"x10" CUT TO ANGLE OF ROOF
½"x 10" LAG SCREW
BOTTOM CORD TRUSS
Porch Pole RAFTER
8"+ TOP SILL
1" SADDLE BLOCKS
TYPICAL WALL SECTION
W.C. 2008
9'
GERTS AT 34" AND 82"
1"x3" FURRING STRIPS
FASTEN TO GERTS W/ 4½" FASTENERS
½" PANNELING
BLACK FELT PAPER
2" Rigid INS
VAPOR BARRIOR
1" Rigid INS
1" VERTICLE LARCH SIDING
34"
8"+ POST 12' O.C. EA WAY
1" LARCH DECKING
1" Sub floor
2½"x6"
2"x6" PORCH FLOOR JOICE LARCH
2½ x2½*
½" SUBFLOOR
* PLACE DIRECTLY ABOVE JOICE AND ENFILL W/ RIGID FOAM
2"x8" JOIST 16" CTR.
HEAD SPACE FOR POSIBLE VERTICLE MOVEMENT
8"x8" SPRUCE SILLS
¼" PLATE TO FASTEN SILL TO PIER
2" RIGED FOAM
8"x8" CONCRETE PIER POURED TO GRADE
⅜ CEMENT BOARD
VAPOR BARRIER HELD IN PLACE W/ #2 ROUND STONE
2" RIGID FOAM
METAL LATH
1' DIA CONCRETE PIER POURED IN PLACE W/ 4-½" RE ROD



Clockwise from left: Bill Castle's modified timber frame building method. Joints are secured with half-inch lag screws, and although the logs look round on the cabin interior, they're milled flat on one or two sides. This building technique uses an energy-efficient "insulation sandwich."

DRAWING: POLLYWOGG HOLLER ARCHIVE; TOP: CHRIS MCCLELLAN (3)

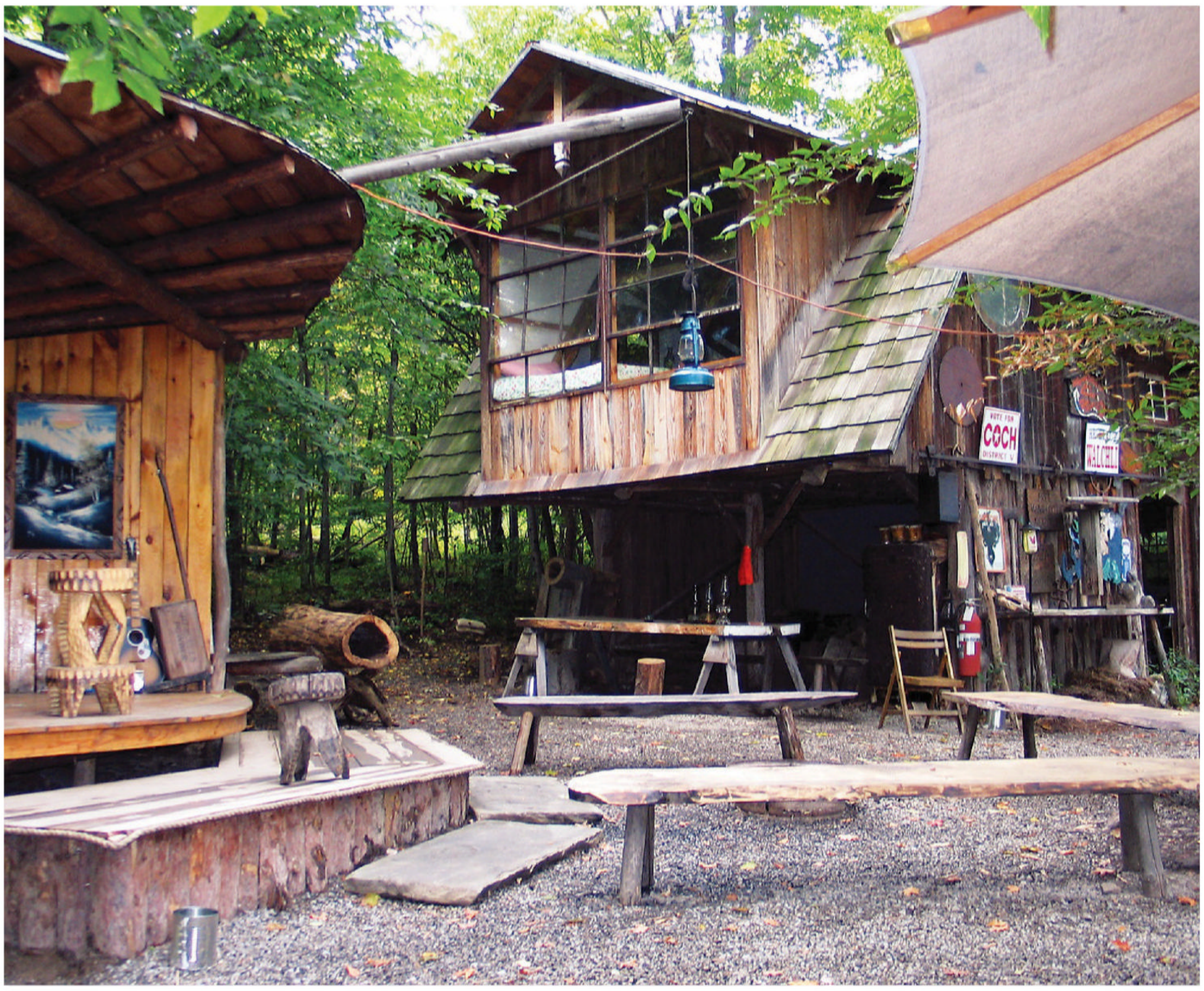
over three summers is a great way to spend quality time with your teenage children, but the process uses more time and material than timber-framing a similar space. Also, while he prefers to work with round timber, the natural curves and variations in tree formation that give round pole construction its aesthetic beauty also make it difficult and time consuming to execute, with complex cutting and matching. So, using low-cost material only partially makes up for the extra effort.

Many timber-framers mill timbers flat and square on all sides. Timbers trimmed square and straight are easier to work with, especially when it comes to cutting joints or attaching sheathing to the outside of the timber frame. The downside is that square-timber framing usually requires expensive woods, such as white oak, that are dimensionally stable and don't tend to twist as they dry.

Framing in the Round

Bill has found a compromise that gives him the benefits of both techniques — a kind of "three-quarter-round timber frame." He simplifies his cutting and fitting by milling one or two sides of each log flat, but he leaves the other sides "in the round," which keeps the wood stronger and less likely to twist. This allows him to utilize smaller trees of non-premium species, even with minimal drying.

A three-quarter-round timber frame is assembled with flat sides of the wood facing out, making it easy to square and plumb the sides of the building. Milling only the surfaces of



Pollywogg Hollër, built by Bill Castle and his family, has grown from one cabin into an "eco-retreat."

the wood that will be covered by the building sheathing also saves half to three-quarters of the milling time, while retaining the rustic beauty of the round wood where you can see it on the interior walls.

The system of joinery Bill has developed to work with his three-quarter-round timbers is quick, easy, and forgiving. He starts by squaring the round wood at the location of the joint with a radial arm saw and a chisel. A chainsaw will do the job a lot quicker, but the visual quality of the joint suffers.

Squaring the timber at the joints makes it easier to lay out cross pieces and knee braces. The resulting edge between the round and square portions of the timber also wedges the wood together in a way that adds strength to the joint. The connection is secured by countersinking one or two half-inch lag screws through the "meat" of both timbers (see photo, top right, Page 52.)

The flat surfaces of the three-quarter-round timber frame also make it easier to attach sheathing and roofing with minimal cutting and fitting. Bill usually sheathes his buildings with a "sandwich" of rough-sawn boards around a core of 2 to 4 inches of foam insulation, making these buildings extremely tight and well-insulated (see illustration, far left).

More Tips for the Technique

Designing a building on a 4-by-8-foot module (open space between timbers of 4-by-8-feet on center) has a number of benefits. The timber frame will cover most, if not all, of the joints if you use drywall as the interior layer of your sheathing sandwich, saving time in the finishing process. The drywall can even be painted before it is hung, with no taping or masking!

Not one to waste anything, Bill sheathed his furniture workshop with "log siding" made from the cut-offs or "slab wood" left over from milling the frame and interior sheathing for the building.

The wood in all of Bill's buildings was selectively cut from his property or within a few miles. Compared with clear-cutting the forests of Canada and trucking in the lumber, local wood has a significantly smaller ecological footprint. The practice also supports the local economy.

If you use a lot of wood like Bill does, it can even make sense to purchase your own mill. Because Bill also carves large tables from single slabs of wood, he has a custom-made mill that can turn a 5-foot-diameter tree into lumber.

The Castle family has built two houses and a wood shop for Bill's furniture-making business using his three-quarter-round timber frame method. A small crew was able to rough in the buildings in a little less than 10 days per structure. And each of these house shells was completed for less than $10,000 (in 2009 dollars), which comes out to the bargain price of about $10 per square foot!

MIKAEL CASTLE; BOTTOM RIGHT: WILLIAM CASTLE (2); TOP: CHRIS MCCLELLAN

Bill Castle uses thick slabs of wood cut on a custom-built mill to create artistic Adirondack-style furnishings.

BACK TO BASICS

Make Your Own Shampoo, Deodorant, and Toothpaste

Whip up these three recipes to save money and avoid any unwanted ingredients that may be found in commercial products.

By Hannah Kincaid

Given all the concern about the many harmful chemicals present in our environment, you would think that the personal care products we use every day—items such as deodorant, shampoo, and toothpaste—would be FDA-approved to confirm they're safe. Manufacturers, however, aren't required to test these common toiletries for safety. While manufacturers are required to list ingredients for personal care products, they don't have to list individual ingredients for fragrances in those products or for perfumes. The cocktail of compounds found within a fragrance is considered a trade secret, which means no ingredient has to be listed individually. Testing has revealed an average of 14 hidden, unlisted compounds per fragrance formulation.

The nonprofit Environmental Working Group (EWG) has been covering this issue for close to two decades, and the organization explains that the Food and Drug Administration (FDA) has authorized the personal care products industry to police itself through the industry's own Cosmetics Ingredient Review panel. The EWG reports that in the panel's more-than-30-year history, it has declared only 11 ingredients or chemical groups to be unsafe. Plus, the panel's recommendations are not binding.

Here's how the EWG explains the potential dangers of some toiletries:

"People are exposed to cosmetics ingredients in many ways: breathing in sprays and powders, swallowing chemicals on the lips or hands, or absorbing chemicals through the skin. Biomonitoring studies have found that cosmetics ingredients, such as phthalate plasticizers, paraben preservatives, the pesticide triclosan, synthetic musks, and sunscreen ingredients, are common pollutants in the bodies of men, women, and children.

"Many of these chemicals are potential hormone disruptors," the report continues. "Cosmetics frequently contain enhancers that allow ingredients to penetrate deeper into the skin. Studies have found that people exposed to common fragrance and sunscreen ingredients have health problems, including increased risk of sperm damage, feminization of the male reproductive system, and low birth weight in girls."

Most marketing claims on personal care products are unregulated, and companies are rarely, if ever, required to back them up. The FDA says descriptions such as "hypoallergenic" and "natural" can mean anything or nothing at all.

Minty-Fresh Peppermint Toothpaste

The cool, clean taste of peppermint is the quintessential toothpaste flavor. In both cosmetics and bath products, mint is used as a skin soother, deodorizer, and cleanser. For more recipes by Janice Cox, order her books at *Store.MotherEarthNews.com. Yield: 2 ounces.*

1 tablespoon fresh peppermint leaves, chopped
¼ cup water
½ teaspoon cornstarch
½ teaspoon sunflower oil

Place chopped mint leaves in a small saucepan and cover with water. Bring mixture to a boil. Remove pan from heat and let cool 15 to 20 minutes. In a separate bowl, stir cornstarch and oil until smooth. Strain the mint out of the water, and then add the cornstarch mixture to the pan. Stir well. Return the pan to the stovetop and apply medium heat. As soon as the mixture reaches a boil, turn off the heat and allow it to cool completely. Stir well, and place the finished toothpaste in a small, clean container.

—Janice Cox

RAPUNZEL
ORGANIC CORN STARCH
Spectrum.
Organic
HIGH HEAT
Sunflower
OIL
Toothpaste

Head over to *www.FDA.gov/Cosmetics* for additional information.

Avoid harmful ingredients and take a stand against labeling confusion in personal care products—and save money in the process—by making your own toiletries with the recipes shown here.

Skin Deep

If you want to research your favorite products, the EWG's website features the Skin Deep Cosmetics Database (at *www.EWG.org/SkinDeep*), which includes information and safety ratings for more than 69,000 body care products, including shampoo, deodorant, toothpaste, makeup, and more. Take this wealth of knowledge on the go by downloading the EWG's free *Skin Deep* app, which lets you scan the barcodes of cosmetics and bath products for an instant safety rating based on ingredients and environmental impact.

Homemade Deodorant Recipe

Making batches of homemade deodorant is simple and cost-effective. The Mother Earth News editors have tested this recipe, and they report that it's definitely not the pits. You can use either arrowroot flour or cornstarch as the thickening agent, but arrowroot flour is less abrasive. Some people report experiencing irritated skin after prolonged, topical applications of baking soda. For a baking-soda-free deodorant recipe, go to *www.MotherEarthNews.com/DIY-Deodorant.* Because of coconut oil's low melting point, store your finished homemade deodorant in a glass or metal container kept in a cool location to prevent it from oozing liquid oil. *Yield: 8 ounces.*

½ cup baking soda
½ cup arrowroot flour or cornstarch
½ cup coconut oil, melted
20 drops essential oil of your choice
Container for deodorant, sterilized and dried

Mix baking soda and arrowroot flour or cornstarch in a small bowl. Slowly add melted coconut oil, stirring until your mixture becomes a thick paste, about the consistency of glue. Add essential oil of your choice and mix thoroughly. Pour deodorant paste into your sterilized container, and place in fridge for 1 hour until it sets up. Store homemade deodorant in a cool, dry location.

—The Old School

Shimmer and Shine: Basic Shampoo

This tress-cleansing concoction will seem thinner than most store-bought shampoos, but the effectiveness will be equivalent. *Yield: 4 ounces.*

¼ cup water
¼ cup liquid castile soap, such as Dr. Bronner's
½ teaspoon light vegetable oil (omit if you have oily hair)

Mix all ingredients in a small bowl. Pour the shampoo into a clean squeeze bottle or empty shampoo bottle. Apply to wet hair. If enhanced with egg, be sure to rinse with cool water.

Shampoo Enhancers

For dry hair, mix 1 tablespoon of honey with 1 tablespoon of Basic Shampoo.
For oily hair, mix 2 tablespoons of fresh lemon juice with 1 cup of Basic Shampoo.
For normal hair, mix 1 raw egg with 1 tablespoon of Basic Shampoo.

—Janice Cox

CERTIFIED FAIR TRADE
Dr. Bronner's Magic Soaps
PURE-CASTILE SOAP
SOME HONEY
CLOVER

HANNAH KINCAID (2); PAGE 54: DREAMSTIME/FRANNYANNE

Make Your Own NATURAL LAUNDRY SOAP

When you're the soap-maker, you'll no longer have to guess about the mysterious chemistry in your wash.

DREAMSTIME/OOCOSKUN

By Karyn Siegel-Maier

Manufacturers of commercial laundry products spend plenty of money on advertising to convince us that their products contain "magical" ingredients that can solve any laundry problem. Well, they don't, and they can't.

With their cleaning power stemming from caustic bleach and optical brighteners (which can be strong allergens), and frequently containing persistent organic pollutants as stabilizers, these products turn out to be anything but magical. Many commercial laundry soaps contain nearly 70% ordinary washing soda. The differences among commercial laundry products typically come down to fragrance, color, and the number and type of additives.

The following formulas don't have any magical ingredients. Instead, the cleaning power of these soaps comes from a combination of clean, pure materials. You'll find washing soda in the laundry products aisle of many grocery or big-box stores, as well as online from several sources.

BASIC LAUNDRY SOAP POWDER

This recipe will wash six average loads, but you can easily double it.

1 cup washing soda
1 cup scented baking soda (see "Adding Herbal Aromas," Page 57)
1 cup soap flakes or finely grated pure bar soap

Combine all ingredients and store in a heavy plastic container. Use ½ cup for an average laundry load.

BASIC LIQUID FORMULA

Dr. Bronner's, one of the most popular liquid castile soaps, is available in a variety of scents, if you wish to skip adding your own essential oils.

2¼ cups liquid castile soap
¼ cup white distilled vinegar
1 tablespoon glycerin
¾ cup water
10 to 15 drops essential oil of your choice

Combine all ingredients into a jar or plastic bottle (a good use for recycled laundry soap containers). Shake once or twice before adding to the wash. To use, add ¼ cup per average load; ½ cup for extra large or heavily soiled loads.

HARD WATER FORMULA

Hard water can affect the performance of your laundry soap. This formula uses borax and vinegar as natural water softeners.

1 cup soap flakes or finely grated pure bar soap
1 cup washing soda
½ cup borax
2 cups vinegar
10 drops essential oil of choice

Combine the soap, washing soda and borax in a heavy plastic container. Blend the vinegar and essential oils in a separate container, preferably one with a pour spout. Use ½ cup of the soap mixture for washing; add ½ cup of the vinegar mixture during the rinse cycle.

BABY LAUNDRY SOAP FORMULA

Babies can sure get their clothing messy! Borax and vinegar will help to whiten and soften fabrics.

2 drops essential oil (optional)
2 tablespoon liquid castile soap
¼ cup washing soda
1 cup baking soda
¼ cup borax
¼ cup white vinegar

If using essential oil, mix with the castile soap. Add this mixture to washer along with the washing soda, baking soda, borax and vinegar. Launder as usual.

LEMON FRESH LINEN WASH

This formula can be used for any type of laundry, but it's especially nice for cotton linens that have been allowed to dry naturally in the sun after washing. The aloe vera juice and vinegar soften, while the citric acid and grapefruit extract brighten and sanitize.

2 cups liquid castile soap
½ cup aloe vera juice
½ cup white vinegar
1 cup water
1 tablespoon powdered citric acid
2 teaspoons grapefruit seed extract
15 to 20 drops lemon (or lemongrass) essential oil

Combine all ingredients into a plastic container, preferably one with a pour spout, and gently turn it upside down once or twice to make sure all the ingredients are evenly distributed before adding it to the washing machine. Use ¼ cup for an average load.

FINE WASHABLES FORMULA

Rosemary is an old favorite for freshening delicate knits and lingerie. Note: Do not use on items that are 100% wool, silk, or satin because rosemary can cause stains.

1 ounce liquid castile soap
1 cup rosemary infusion

For the infusion: Steep two sprigs of fresh, bruised rosemary (slightly crushed between the fingers to release the oils), or steep 1 teaspoon of dried, crushed rosemary leaves in 1 cup boiling water for 15 minutes, then strain.

If using essential oil instead of dried leaves, add 3 drops to 1 cup of hot water. Combine ingredients. To use, place the clothes in the washer and add about ¼ cup of the formula for an average load. Launder in cold water on the gentle cycle.

DIAPER WHITENER

Add ½ cup borax, ½ cup vinegar, and 6 to 8 drops of essential oil to a pail or bucket of hot water. Soak diapers for 20 to 30 minutes, or more if heavily soiled, before laundering.

PRETREATMENTS FOR STAINS

Because vinegar can remove some dyes, test the following formulas on a small area of the fabric before treating the stain.

TEA TREE & SALT PRESOAK

This stain remover is another great vinegar-based solution.

1 cup vinegar
½ cup salt
3 drops tea tree essential oil

Place clothes in washer and add enough warm water to cover them. Combine all ingredients and add to washer. Let clothes soak for an hour or more, then wash as usual.

SWEAT STAIN REMOVER

Use this formula to pretreat ring-around-the-collar and perspiration stains.

¼ cup vinegar
4 drops lemon, lime or eucalyptus essential oil
1 tablespoon baking soda

Combine all ingredients. Rub the mixture into the stains with your fingers, a soft cloth or an old toothbrush. Launder as usual.

LEMON & TEA TREE PERSPIRATION PRESOAK

Try this fresh-smelling pretreatment before you wash.

1 cup vinegar
¼ cup lemon juice
6 drops tea tree essential oil

Combine all ingredients and add to the clothes in a washer full of warm water. Allow to soak for an hour or two, then wash as usual.

Adding Herbal Aromas

Herbal essential oils can be blended into laundry formulas (liquid or powder) or added to the softener dispenser of your machine. Essential oils not only boost cleaning power, they also provide a fresh, clean scent.

Many nontraditional healers believe essential oils can also lend therapeutic qualities. For instance, they would recommend adding tea tree essential oil to your laundry if you suffer from frequent yeast infections. Eucalyptus essential oil can be used when someone in the household is fighting a cold. Jasmine, rose, or ylang-ylang essential oil will impart a romantic scent to fine washables. Feel free to experiment. You can even create your own unique blend from the essential oil chart on the right.

Herbal-scented baking soda is another way to use essential oils in the laundry. Baking soda adds whitening power and is a natural water softener. For a 16-ounce box, use 15 to 20 drops of essential oil. You can mix it right in the box! Simply add the oils to the box and shake well. Or add 3 to 5 drops of essential oil to 1 cup of white vinegar; the oil lends additional cleaning power and helps remove odors.

Be creative, and you'll find that you won't miss store-bought detergents at all.

ESSENTIAL OIL CHART FOR LAUNDRY

All of these essential oils help clean and freshen the laundry. They offer other benefits as well.

Cedar: Adds a clean, woodsy scent.
Chamomile: Soothing.
Eucalyptus: Excellent for colds and sinus trouble.
Lavender: Relaxing.
Lemon: Stimulating, helps whiten laundry.
Peppermint: Good for colds and sinus trouble.
Rose geranium: Adds a romantic scent.
Rosemary: Calming, but often stimulating on its own. Not suitable for wool, silk, or satin.
Sweet orange: Helps remove stains and whiten laundry.
Tea tree: Antibacterial and antifungal.

Excerpted from *The Naturally Clean Home* by Karyn Siegel-Maier with permission from Storey Publishing. Available for purchase online at *Store.MotherEarthNews.com*. Siegel-Maier writes about herbs, health and alternative medicine for a variety of magazines.

Choose the Right CHICKEN FEED

Feed your birds the right blend of protein, fat, and calories, and you'll have healthy chicks that grow into productive laying hens or tender, flavorful meat chickens.

By Carol Ekarius

My family eats primarily organic foods, so I don't feed our animals differently from the way we feed ourselves—particularly if those animals are producing food that we will eat. There are several reasons to choose organic chicken feed. Though the macro nutrients (such as protein and fat) tend to be comparable between industrial and organically grown foods and animal feeds, big differences show up in the micronutrients, such as important enzymes, vitamins, and minerals, which are routinely higher in organically grown food. Pesticide residues are significantly lower in organic foods, and though the quantities may be minute, I'd rather avoid these residues altogether.

I don't want to support a farming system that results in the die-off of the birds and the bees, and harms farmers and ranchers. The organic approach is better for both the planet and people, particularly the people who raise food! Finally, the top reason for finding organic chicken feed: If you raise poultry to sell meat or eggs (or are considering doing so), going organic should allow you to charge a significant price premium. Find an interactive map of organic poultry feed producers at *www.MotherEarthNews.com/Feed-Providers.*

Types of Chicken Feed

The right feed depends on the age of your birds, whether you're raising meat chickens or layers, and what type of birds you're raising—fast-growing hybrids or slower growing heritage breeds. Most chicken feeds are available in the form of a "mash"—a fully ground and mixed ration that looks almost like coarse flour—though you can also find them granulated or pelletized. Here are the main types you'll choose from:

Chick starter. Just as human babies don't start life on the same diet as adults, chicks also need their own special food when they pop from the egg. Chick starter is like infant formula for poultry—much higher in protein and amino acids, for example, than mature birds need. You should feed your chicks a chick starter for their first 3 weeks or so, after which you should switch to a grower ration.

Grower ration. Poultry grower formula has slightly lower protein and is higher in fat than chick starter. Layers stay on grower ration until they reach 12 weeks of age for the fast-growing breeds such as leghorns and hybrids, and 15 weeks of age for slower growing dual-purpose breeds.

You should switch meat chickens (also known as fryers or broilers) from chick starter to grower ration for weeks 3 through 6 for hybrids, weeks 3 to 8 for traditional meat breeds such as the

ISTOCK/EUROBANKS

Chicks have different nutrition needs than pullets or laying hens, and broilers need specially formulated feed for efficient growth.

Cornish, and weeks 3 through 10 for dual-purpose heritage breeds.

After three weeks on grower ration, we like to add some scratch to our chickens' diet, as well as small amounts of kitchen scraps (more about this below).

Finisher. Finisher feeds are specifically formulated to grow out meat chickens quickly in the final weeks before butchering, as fast growth results in a more tender and profitable bird. The finisher feed has lower protein than grower ration but higher fat and fiber, and is fed right up until butchering. This time span is highly dependent on the breed and ranges from about 8 weeks for fast-growing hybrids to as long as 22 weeks for some of the larger dual-purpose breeds. Fryers are usually butchered earlier, starting at about 9 to 12 weeks, and broiler chickens are butchered later, starting about week 15 to 22.

Layer feed. There are a couple of different commercial choices for layer feeds. One approach is to feed a complete feed mash that typically runs about 16% protein, or feed a higher protein mash (typically 20%) with scratch feed as a supplement.

Scratch. Scratch feed is a blend of grains that can be fed on the ground in the yard, or on a deep bed of hay and straw (that the birds will pick through, and that helps keep their coop clean, dry, and warm). It provides them not only with high-energy grains and seeds, but also keeps them doing the scratching—hence its name—which is a natural behavior chickens really love.

Grit. Chickens need grit for their gizzards—a muscle in their digestive system that grinds up grain and other food. Free-range birds usually can find grit—gravel and pebbles—as they roam, but confined chickens will need your help. You can buy poultry grit at a feed store, or you can scavenge your own and place a small bucket of grit inside the confinement area. Some growers offer crushed limestone rock as part of the grit or place limestone dust in large, shallow pans for dust bathing. There's some anecdotal evidence to indicate the birds may be ingesting sufficient calcium via the dust to strengthen their eggshells.

Free-Range Chickens

Allowing your birds to range freely on your property permits them to choose a natural diet of fresh greens, insects, worms, and such. Studies have shown that eggs and meat from free-range chickens are generally more nutritious than products from birds raised in industrial confinement systems. Unfortunately, predator pressures may make the free-range option difficult for many of us. If your birds are not free-range, then always remember that they are totally dependent on you to provide them with proper kinds of feed.

Food from the Kitchen and Garden

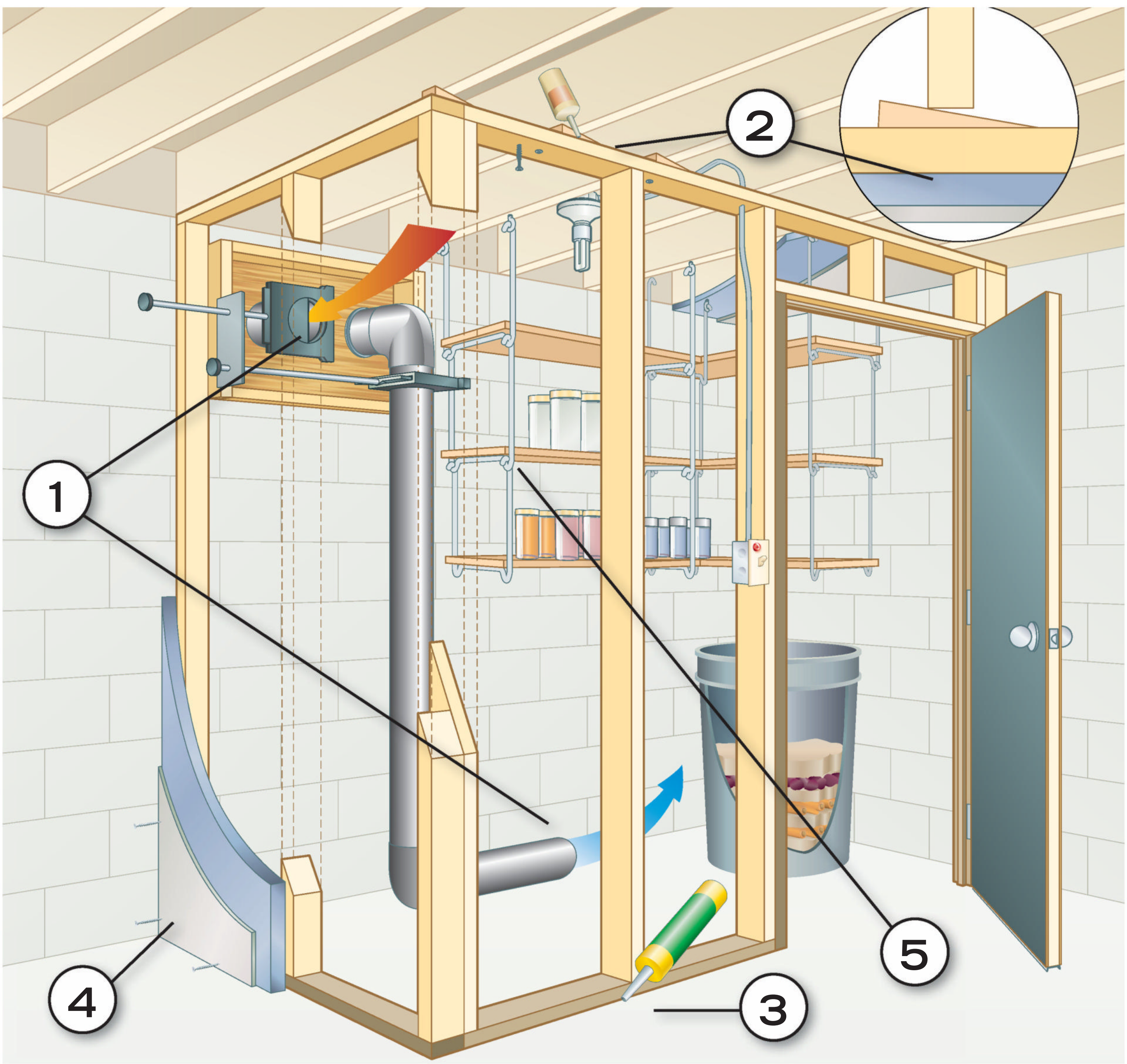
The great thing about chickens is that they, like us, are omnivores. For small layer flocks, a lot of their feed can come directly from the kitchen and garden. Your chickens will relish all kinds of garden crops—beet tops, spent broccoli, kale, turnips, and many others. Cover crops such as winter rye, Austrian peas, and buckwheat can be cut and fed to your flock. Even fresh lawn clippings of grass and clover make good poultry food.

Thanks to its wide array of ingredients, the kitchen diet does a great job of emulating the diverse feed that free-ranging birds in the wild would access. We feed all of our leftovers and scraps, and the birds get a small bowl of milk morning and night. Melon rinds can just get thrown into the chicken yard. Leftover pasta, stews, and the like can simply be dumped in a pile. The chickens will do the rest, and they'll think you're a hero if you bring out that bucket of goodies each day.

Family flocks fed largely from the kitchen still need some things humans probably don't eat. Layers should have free access to oyster shell—a calcium supplement to help keep eggshells strong (see also "Grit," at left)—and, at a minimum, all adult birds need hen scratch. A small container of free-choice layer feed will round out your chickens' diet, but they won't eat much of it if fed from the kitchen.

Water is essential. An egg is 65% water by weight, and a chicken is almost 50% water by weight. Make sure that your birds have ready access to clean, fresh water at all times. They'll require up to four times as much water during hot weather than cold—and twice as much if they are laying than if they are not.

ISTOCK/ANDIPANTZ; TOP RIGHT: ISTOCK/NORTHLIGHTIMAGES



Build a Basement Root Cellar

By Steve Maxwell
Illustrations by Len Churchill

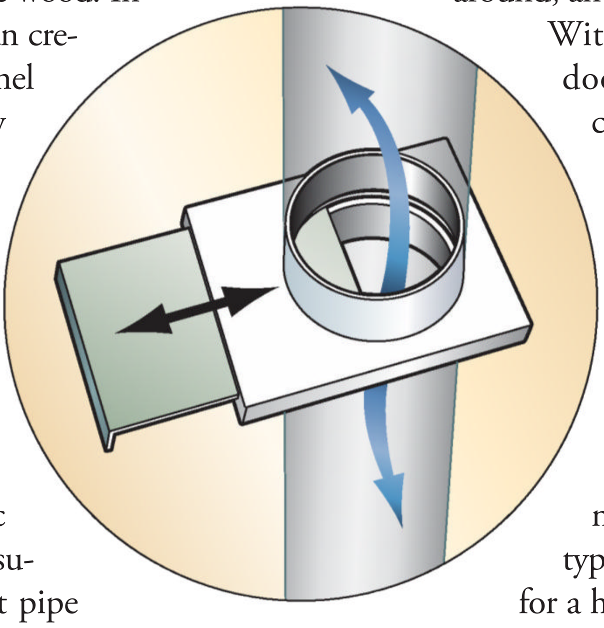
The great thing about cabbage, carrots, and many other garden crops is that all you need to store them for months is a cold, well-ventilated space. A spare refrigerator works pretty well, but a real root cellar is even better and more spacious. Traditionally, this cold room was an underground space built beneath or near the home, insulated by the ground, and vented so cold air could flow in and warm air out in the fall. The vents were closed when winter temperatures arrived, and the cellar stayed cold but not freezing.

Most modern basements are too warm for long-term winter storage, but you can create an indoor version of the cellars that have long served homesteaders well by walling off a basement corner and adding the vents, as shown in the drawing above. The two vents (see **No. 1**) create a siphon effect that lets you regulate the flow of cold outside air into the insulated cellar room, allowing the temperature to remain near freezing through the winter months. Fred Matlack of Vera Cruz, Pennsylvania, developed this nifty design, and the cellar room he built in his

Storing root crops in a passively cooled cellar is one of the most efficient ways to preserve food.

basement has worked exactly as he had planned. "You just need to watch the temperature to be sure you close the vents before the temperature drops below freezing, which would damage some crops," Matlack says.

Several constant truths will help you create an optimal root cellar, even though every basement situation is unique. The first is location. Because you'll need access to the outdoors for fresh air, choose a cellar position that includes a window. You can bore holes through a basement wall for the 3- or 4-inch vent pipes you'll need to install, but it's a lot easier to remove the glass from a window, replace it with plywood, and then run your pipes through holes in the wood. In cold regions, you can create an insulated panel to replace window glass. Laminating a layer of ½-inch-thick exterior-grade plywood on each side of a piece of 1- or 2-inch-thick extruded polystyrene foam is a terrific way to make an insulated panel for vent pipe access. Polyurethane construction adhesive is perfect for holding the foam-and-wood sandwich together.



The exterior walls of a basement create ideal interior temperatures for a root cellar. The walls deliver the cooling action, and the more masonry surface you've got, the better. That's the reason you'll want to choose a corner location for your installation if you can. This offers maximum exposure to exterior walls while minimizing the need to build and insulate interior walls. And if you have a choice, select the spot with the highest soil height outside. Does one of your possible options include northern exposure? Terrific! That's great if you have it.

After you've picked your cellar location and replaced the window glass with a solid panel that accommodates the vent pipes, turn your attention to the walls you'll build. Find a helper, grab a sheet or two of plywood or wafer board, and get ready to use your imagination. Temporarily propping up sheet materials will help you imagine the floor plan of a new room, leading you to better finished results. How long should your cellar be? How wide? Would a 3-foot-wide door be big enough? These kinds of questions are much easier to answer if you've got something to hold up, look at, move around, and tweak.

With the footprint and door location of your cellar finalized, mark the relevant outlines on the floor with a big, felt-tipped marker. Although you'll need to build some kind of wood frame for the wall and doorway, it needn't be as beefy as a typical load-bearing wall for a house. You can extend stud spacing beyond 24 inches on center if you need to economize, but regardless of the wall design, you'll have to secure it at the top and bottom. You can use a few tricks to make this happen.

As you custom-cut your wall studs to length, make them short enough to leave a ⅛- to ¼-inch gap between the top of the wall and the joists above when combined with the top and bottom plates (**No. 2**). That way, you'll have no trouble tilting the wall up into position (be sure to check that it's plumb by using a level), yet you can still secure it with 3½-inch No. 10 screws driven up through the top plate and into the bottom edge of the joists. Drive a softwood wedge dabbed with glue into the gap before driving the screws home.

Basement floors are often damp, so consider using composite deck material instead of wood for the bottom wall plate (**No. 3**). Choose a brand that's solid all the way through, then cut and nail it just like regular lumber. Composites are rot-proof and won't contribute musty smells to your cellar, even when they get wet. Anchor the bottom of your cellar wall to a concrete floor using construction adhesive and concrete nails or screws driven into pre-drilled holes.

Insulation is your next challenge, and there are good reasons to consider using rigid sheets of foam (**No. 4**) instead of traditional fiberglass batts. The most important is moisture resistance. Every basement is likely to get damp from time to time, and fiberglass has almost no ability to resist mold growth and deterioration when water is present. Foam, on the other hand, tolerates moisture much better. It's easier to use than fiberglass, and it's non-irritating. Extruded polystyrene is especially good in this regard. It's also a highly effective thermal insulator. Just be aware that some jurisdictions require foam to be covered with a fire-resistant sheet to meet code specifications. As you plan your insulation strategy, be sure to include the ceiling of your cellar as well. Warmth coming down from heated areas above could raise cellar temperatures too high for food storage.

A key feature of the basement cellar is the two-vent design (see **No. 1** on Page 60 and detail illustration at left). For optimal functioning, space the interior ends of the intake and exhaust pipes as far apart as possible. Also, you'll need to plan your shelf layout to allow as much top-to-bottom air movement as you can achieve. This is where ceiling-mounted shelves can really help (**No. 5**). The best idea is to use hanging wire frames that support shelves made of 2-by-12-inch lumber you cut.

Cover the vent openings with screen to keep out insects and mice, and if you want to really cool the room down quickly, add a little exhaust fan to supplement the natural flow of cool air down into the room. For advice on the proper use of your root cellar, see "The Fundamentals of Root Cellaring" at *www.MotherEarthNews.com/Root-Cellaring-Fundamentals.*

Use Cold Frames to GROW MORE FOOD

Sow seeds in simple frames to add more than a month to your spring garden season.

By Barbara Pleasant
Illustrations by Elayne Sears

Gardening guru Eliot Coleman asserts that “the basic cold frame is the most dependable, least-exploited aid for the four-season harvest.” I couldn’t agree more. The winter I built my humble frame of 2-by-4s topped with an old shower door, I gained a month at the front end of salad season. The best part was being able to sow some of my spring seeds directly in the frame. This made more space available under lights indoors for tomatoes and other crops that don’t like chilly conditions, and eliminated the hassle and setbacks involved with hardening off seedlings and then transplanting them. Best of all, seedlings got a head start in real sun, so they never got stretched out and leggy as they often do when started indoors. (Indoor grow lights are vastly less intense than real sunlight.)

What can you sow in a cold frame? In spring you get a boost with virtually any crop by sowing in frames. The list of “Top 12 Winter Cold Frame Crops” (below) can get you started, and as days get longer and warmer in spring, you can try your hand at framing up peas, bulb onions, potatoes, or even tomatoes. When a cold frame is no longer needed for a crop that is up and growing, simply move it to a new location and plant more seeds.

Traditionally, gardeners have used cold frames to harden off seedlings started indoors, but you also can use a cold frame to winter-sow onions, cabbage, or other hardy crops that are easily lifted and transplanted into rows.

A cold frame can be a wood box with a recycled window (or shower door) for the top or a hay bale enclosure covered with plastic. You might build one with bricks or concrete blocks and top it with translucent corrugated fiberglass (see “Anatomy of a Cold Frame,” Page 64). Your frames need not be all alike, though having two of the same size makes it possible to stack them for added height. I like frames I can move around by myself without straining, so size and weight are important considerations. If you live north of Zone 6, you may want to create frames that are large enough to accommodate black, water-filled containers for solar heat storage, and insulate the sides by adding a snug berm of soil or mulch. In climates with chronic winter cloud cover, you can maximize available light by painting the interior walls of your frames bright white, or by covering the walls with heavy-duty aluminum foil.

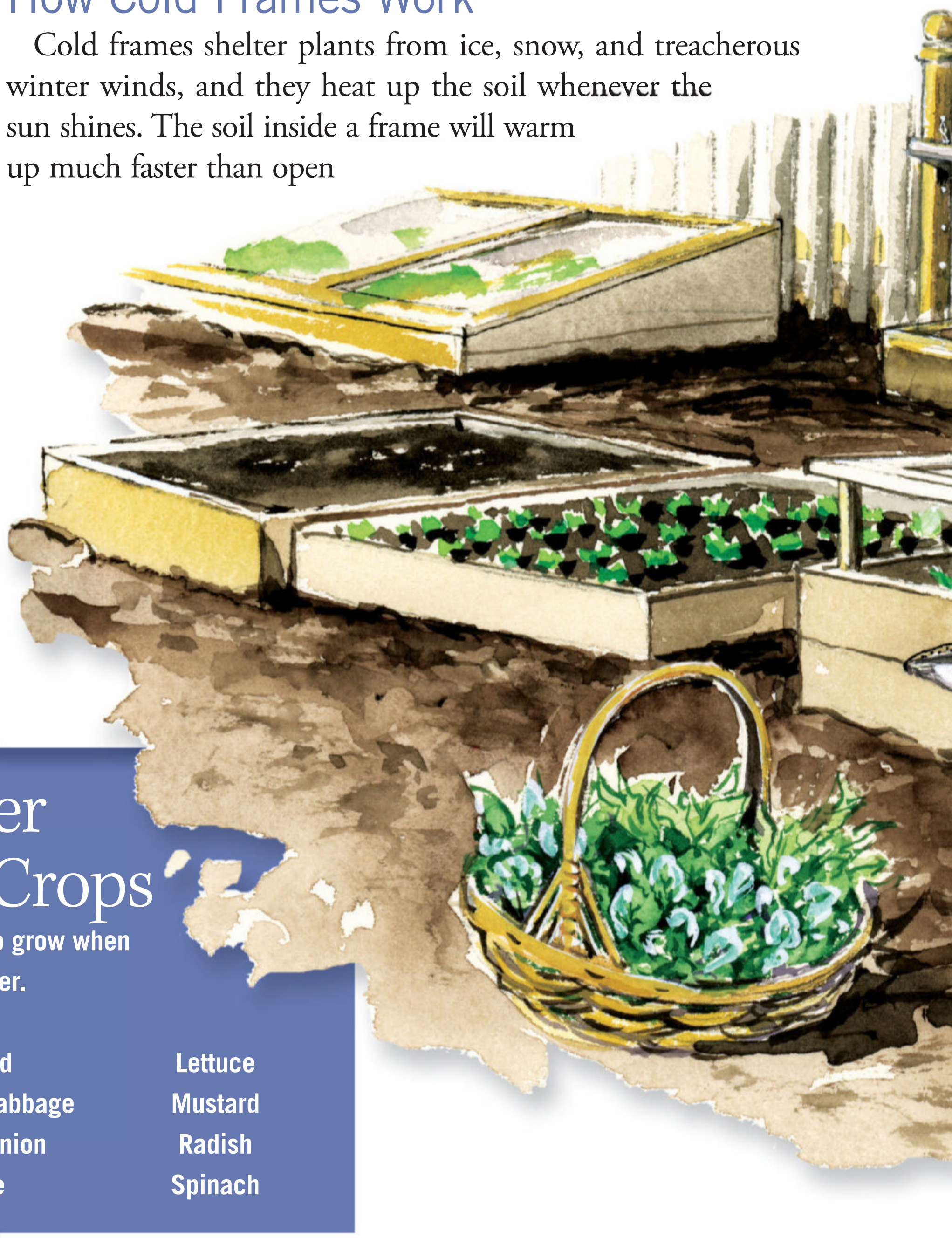
Top 12 Winter Cold Frame Crops

These 12 vegetables are easy to grow when sown in cold frames in late winter.

Arugula
Broccoli
Beets
Cabbage
Chard
Chinese cabbage
Green onion
Kale
Lettuce
Mustard
Radish
Spinach

How Cold Frames Work

Cold frames shelter plants from ice, snow, and treacherous winter winds, and they heat up the soil whenever the sun shines. The soil inside a frame will warm up much faster than open

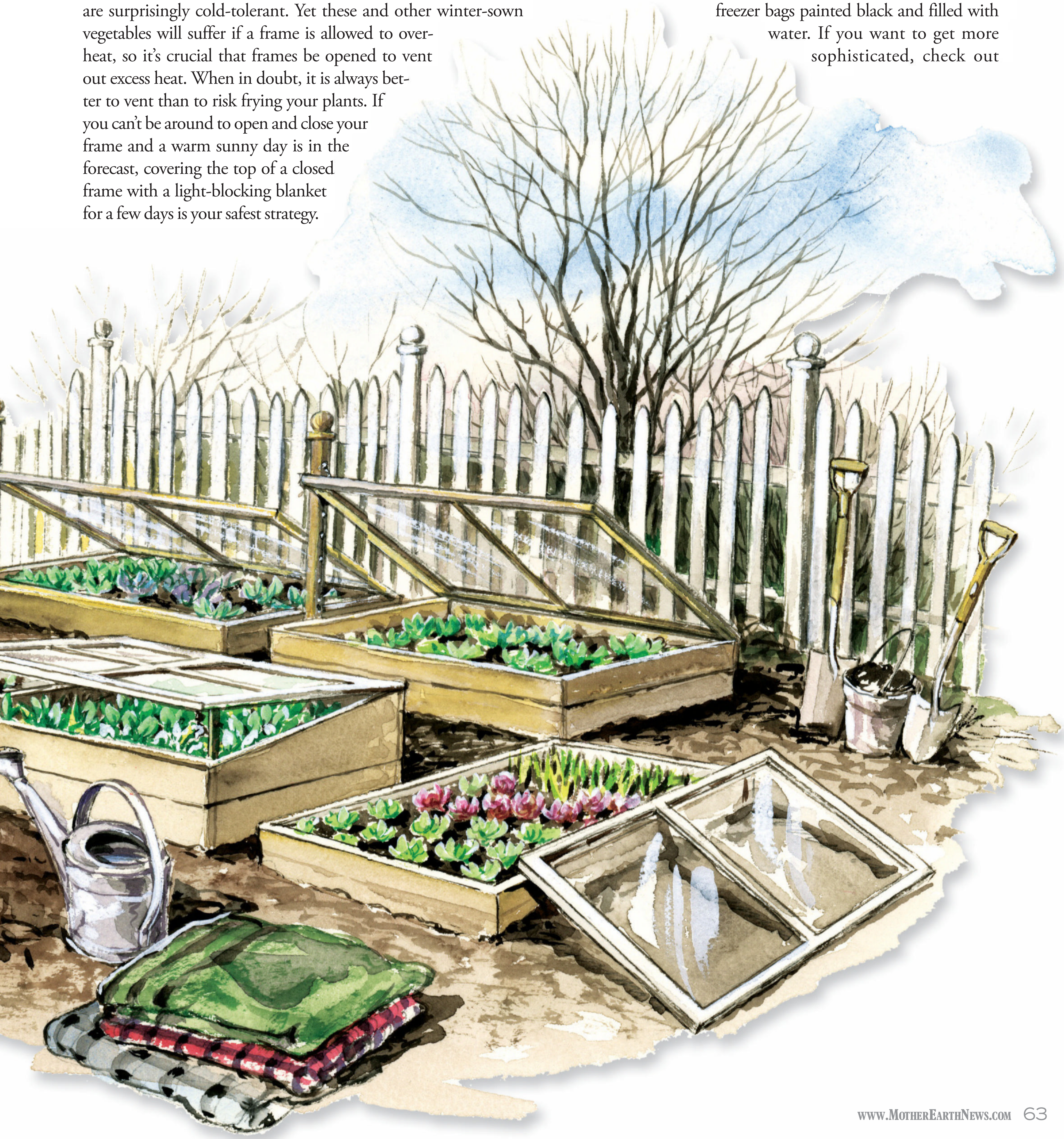


ground. Because seeds of many hardy vegetables can germinate in the 50-degree-Fahrenheit range, a three-day spell of mild weather often coaxes them to life. Weed seeds will germinate alongside the seeds you plant, but you will see fewer weeds if you cover the soil's surface with a 1-inch-deep blanket of potting soil (purchased or homemade). Add water as needed to keep the soil from drying out.

After seeds have begun to grow inside the frames, the plants are surprisingly cold-tolerant. Yet these and other winter-sown vegetables will suffer if a frame is allowed to overheat, so it's crucial that frames be opened to vent out excess heat. When in doubt, it is always better to vent than to risk frying your plants. If you can't be around to open and close your frame and a warm sunny day is in the forecast, covering the top of a closed frame with a light-blocking blanket for a few days is your safest strategy.

Climate-Controlled Frames

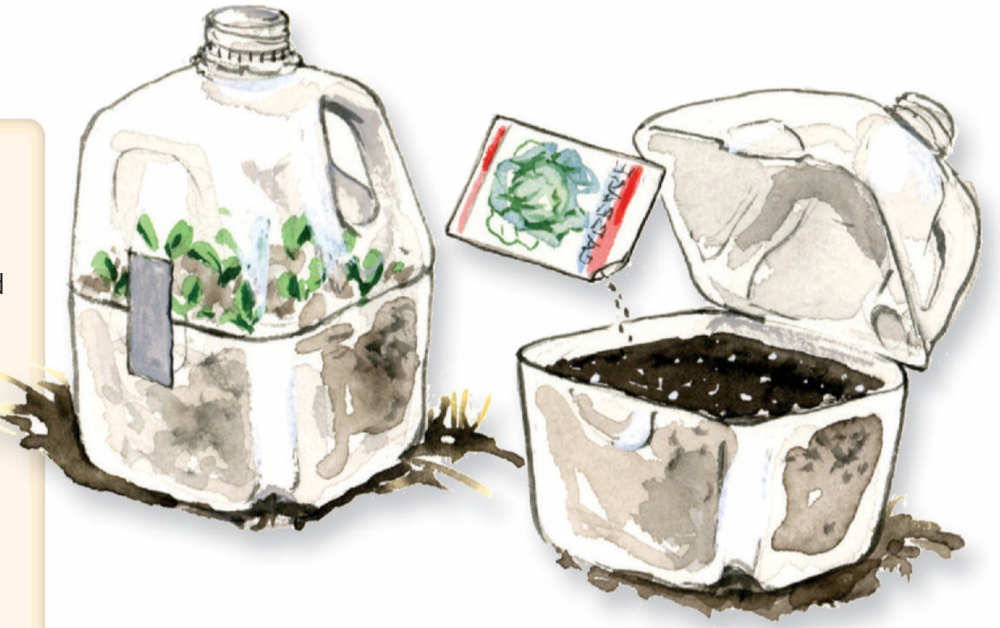
Any cold frame will harness solar energy for your plants' benefit, and there are several low-tech ways to help your frames retain solar warmth. Black antifreeze containers, or milk or kitty litter jugs painted flat black, can be filled with water and tucked in the corners. Or you can cover the spaces between plants with flat stones painted black, or "solar pillows"—plastic freezer bags painted black and filled with water. If you want to get more sophisticated, check out



Milk Jug Seed Starters

This simple technique was developed for seeds that need to spend a winter outside before they will germinate, but it's also a great method to start garden seeds in late winter if you don't have indoor lights or a cold frame.

1. Cut a gallon milk jug (or other large plastic container) in half horizontally, leaving one edge intact to use as a hinge. Discard the cap.
2. Punch several drainage holes in the bottom.
3. Fill the bottom with 3 inches of potting soil, moisten well, and plant your seeds.
4. Fold down the top cover and secure the cut seam with duct tape. Enclose the planted jug in a large clear or opaque plastic bag (such as a produce bag), held together at the top with a twist tie.
5. Place in a sunny, protected spot outdoors.
6. One week before transplanting, harden off seedlings by removing the bag and tape, and propping the jug open with clothespins.



the Solar Pods and Solar Cones developed by New Hampshire gardeners Leandre and Gretchen Poisson. Described in detail in their book *Solar Gardening*, and in Mother's online Archive (go to *www.MotherEarthNews.com/Intensive-Gardening*), the Poissons' devices are probably the best you can build if you can afford the materials. The superior performance of these garden appliances comes from the use of Sun-Lite flexible fiberglass, which costs about $50 for a 2-by-8-foot piece from box stores.

Historically, gardeners have used the warmth generated by rotting manure to turn cold frames into hot beds. To make a hot bed, dig a hole inside your frame at least 12 inches deep and fill it with fresh horse manure mixed with straw and topped with 6 inches of soil. As the manure decomposes, it releases heat into the frame.

But you don't need fresh manure to build a hot bed—or at least a warm one. For example, let's say you want to winter-sow broccoli, spinach, or another crop that needs abundant nutrients. If you dig out a bed and refill it halfway with compost mixed with the cheapest dry dog food you can find (a surefire compost activator), and then top it with 6 inches of soil, the compost will generate enough heat to keep the little plants from freezing and thawing quickly—if they freeze at all. In spring, when the plants' roots find the buried treasure deep in the bed, you may be looking at the biggest plants you've ever grown.

Another option is to use the warmth generated by rotting hay to heat your cold frame from the sides. If you have plenty of space available and you plan to mulch with hay or straw this season anyway, go ahead and get four bales and arrange them in a semicircle on ready-to-plant ground, with the open side facing south. Plant the middle, and then top the bales with a wide sheet of plastic stapled to two 2-by-4s; one board will lie atop the back bales, and the other will anchor the plastic to the ground in front. You can make a bigger hay bale haven by arranging seven or eight bales in a square, and topping the enclosure with an old window, glass door, or piece of sheet vinyl or corrugated fiberglass. Or, make your bales go twice as far by halving them horizontally and encircling your planting with half bales, set side by side with their cut sides out. Allow the broken bales to get damp before you plant, and then cover the bed and bales with a large piece of plastic sheeting. As the wet hay decomposes, much of the heat it releases will stay inside the bed.

To prepare a hot bed, warm bed or solar-charged cold frame if the soil is frozen, simply place a closed frame over the spot for several days. Daytime heating will thaw the soil.

Various types of cold frames are multiplying like rabbits at my place, and spring now comes to my garden at least six weeks ahead of schedule as a result.

Anatomy of a Cold Frame

Consider these factors when building a box to extend the growing season.

Site surface: Frames work best if the top is angled slightly toward the winter sun. You can either cut slanted sides (see illustration, Page 63) or mound soil to make the back edge of the frame sit slightly higher than the front.

Frame: Scrap wood or untreated 2-by-4 or 2-by-6 pine boards are fine. You can upgrade to rot-resistant cedar, redwood, or locust, or composite plastic lumber. Other options include logs, baled hay or straw, bricks, or concrete blocks.

Corners: If you only have a handsaw, a hammer and a screwdriver, you can build a sturdy box from 2-by-4s, screws, and four steel corner brackets. Brackets come in different forms—some for inside the box and some for outside. The simplest (and cheapest) ones screw into the top of a frame that's already been banged together with 3-inch box nails.

Covers: The best materials for topping cold frames are tempered glass patio doors or shower doors, which are often discarded during remodeling projects. Heavy enough to resist strong winds, shatter-resistant tempered glass doors are better than standard storm windows or paned windows, which can be a safety hazard. Check with thrift stores, Habitat for Humanity's ReStore, or home remodeling or salvage businesses. Look for doors that still have hardware attached and leave it intact. Later, after you've built a frame, the existing hardware may prove handy as part of a hinge or a ready-made handle. Tempered glass doors come in all sorts of weird sizes, so it's best to source a top first, and then tailor the frame to match its dimensions.

Use thick blankets to bring winter-sown frames through winter storms, or to block sun if you can't be around to vent the frames. Snow makes a good insulating cover, too.

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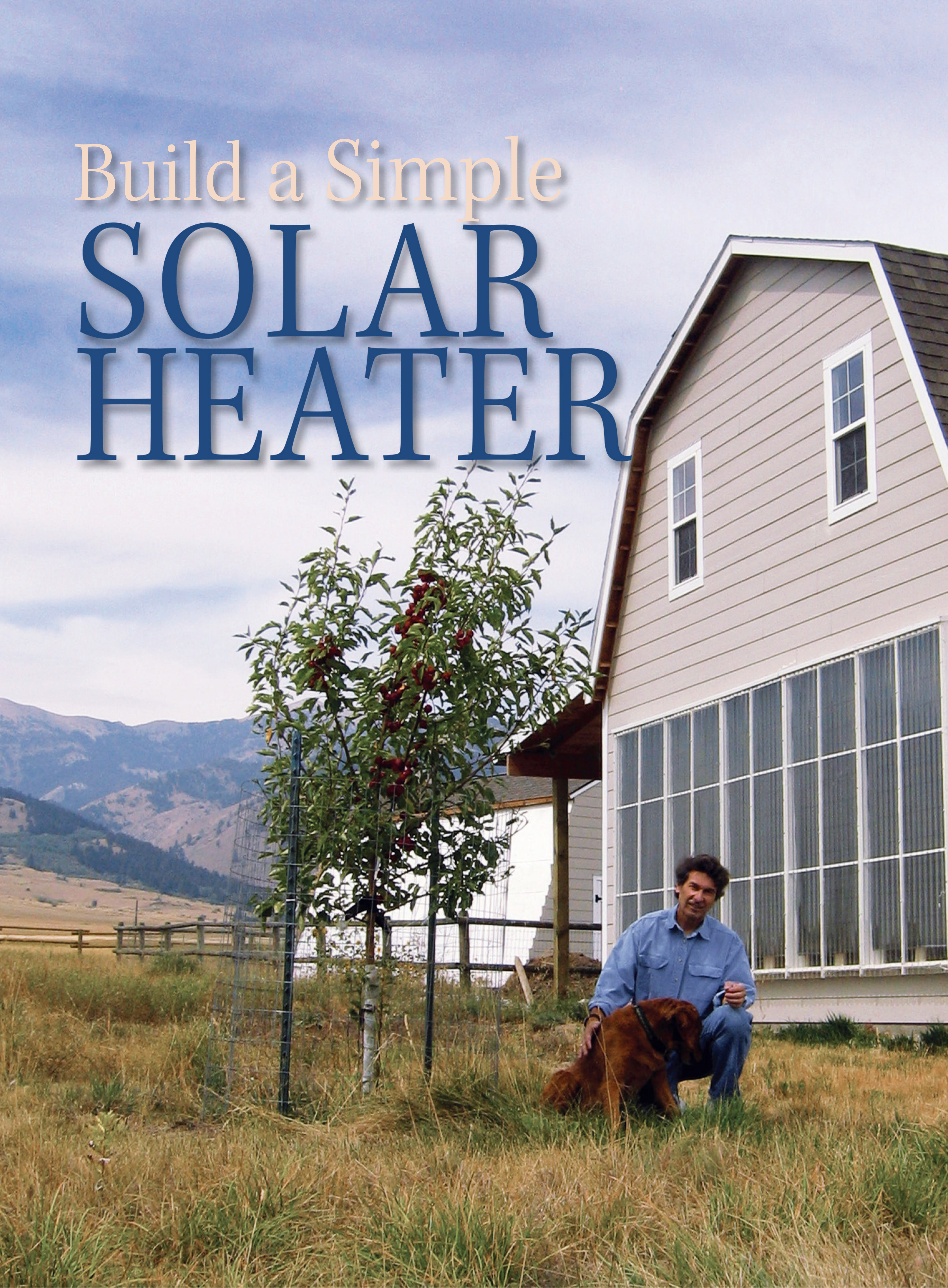
Build a Simple SOLAR HEATER



This low-cost plan lets you turn any south wall into a source of free solar heat.

By Gary Reysa

After walking into my workshop one December morning and feeling a bone-chilling 10 degrees Fahrenheit, I decided to install a heating system. Given the rising costs of propane and my family's environmental concerns about using nonrenewable fossil fuels, a solar solution seemed fitting.

I'm a retired aircraft engineer, but you don't need a similar background to tackle this project. In fact, a solar hot-air collector built into new construction or added to an existing building can be an easy and inexpensive heating solution.

Following the simple principles and plan outlined here, you can heat your workshop, barn or even your home with free heat from the sun. If it works here in Bozeman, Montana, it's bound to work wherever you live.

I reviewed many solar collector concepts and decided to install a thermosiphon air collector on the south wall of the workshop. The elegant, simple thermosiphon design uses only the buoyancy of heated air to create circulation through the collector, eliminating the cost, maintenance and power consumption of fans, sensors, and controllers commonly used in other collector designs.

On a sunny day, in a cold climate like ours, this simple system can produce heat equivalent to burning about $2 worth of propane (equivalent to about $12 for natural gas). To minimize costs, I integrated the collector with the structure and used readily available materials. It cost me about $350 and took only one trip to the hardware store. I built and installed it in about three working days. Follow the suggestions below, and you may be able to do it even faster!

How It Works

The thermosiphon collector consists of clear, corrugated polycarbonate panels fastened to 2-by-6-inch studs. The clear panels admit sunlight, and an absorber suspended inside the collector captures the sun's heat energy. The air around the absorber warms, expands and rises, creating a convection current. Vents at the top and bottom of the collector allow air to circulate through it. Cool air enters the lower vents from the interior, is heated by the absorber, rises to the upper vents and returns to the interior. Air circulation continues as long as the sun shines on the collector.

At night, airflow reverses as air in the collector cools to outside temperatures. Simple flapper valves on the top vents stop this reverse circulation and keep the heat inside.

Performance and Economics

On sunny winter days, the collector raises interior temperatures to between 60 and 75 degrees. In my neck of the woods, that's 25 to 35 degrees above outside temperatures. Overnight, the building typically cools to 8 to 15 degrees above the outside temperature. On heavily overcast days, the collector does little heating, but on partly cloudy days or days with a thin overcast, it provides useful heat. It usually takes about three hours to warm the workshop from 35 to 65 degrees — a good excuse to sleep in! If you're determined to start work early, more insulation, more thermal mass or an early morning blast from a backup heater would be in order.

Be sure to install adequate insulation and to control air infiltration. No solar collector — or any other kind of heating system — will heat a drafty, uninsulated area effectively. The walls and roof of my 700-square-foot workshop are insulated to R-19, which is as good as many houses.

According to my measurements, the heat output per square foot of panel compares favorably to that of most commercial panels — at less than one-tenth the cost! (See "Heat Gain: Running the Numbers," Page 71, for more details.) Our only alternative would have been to heat the workshop with propane. Although a propane heater would have cost a bit less than building the solar collector, paying $2 per gallon for propane over our five-month heating season would have cost us $300 to $400 per year. The simple payback period of the collector is a year or two on materials cost. I haven't needed a backup heater, which is an additional savings.

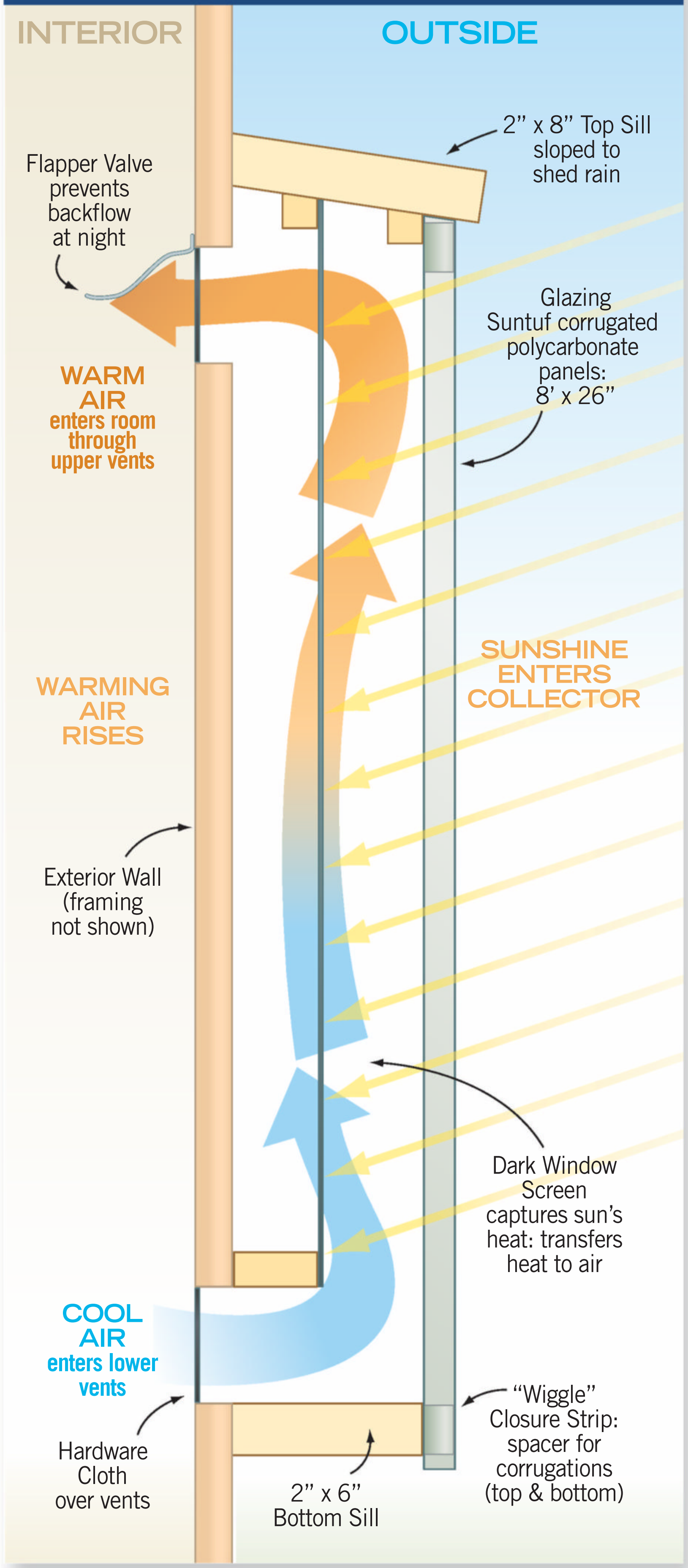
Sizing the Solar Collector

Usually, the bigger the collector, the better. Most outbuildings suffer high heat losses because of high infiltration rates and inadequate insulation, so the heat a large collector generates can be put to good use. More collector area provides some allowance for partly cloudy and thinly overcast days.

With this collector design, overheating usually isn't a problem. You can easily close off upper vents or add thermal mass, such as water containers. Increased thermal mass also reduces nighttime interior temperature swings.

The added time and material cost is small to build a collector that uses the full south wall versus only part of it. Exceptions to using the full wall include locations with mild climates, well-insulated and well-sealed buildings, or buildings that are much longer along their east-west axis than their north-south axis. Even if the entire south wall is not available, using a portion still pays off.

How It Works


INTERIOR
OUTSIDE
2" x 8" Top Sill sloped to shed rain
Flapper Valve prevents backflow at night
Glazing Suntuf corrugated polycarbonate panels: 8' x 26"
WARM AIR enters room through upper vents
SUNSHINE ENTERS COLLECTOR
WARMING AIR RISES
Exterior Wall (framing not shown)
Dark Window Screen captures sun's heat: transfers heat to air
COOL AIR enters lower vents
"Wiggle" Closure Strip: spacer for corrugations (top & bottom)
Hardware Cloth over vents
2" x 6" Bottom Sill

Nuts and Bolts

The collector frame is built of common dimensional lumber and consists of vertical members, a bottom sill and a top sill. In mine, the six vertical 2-by-6-inch studs divide the collector into five 4-foot-wide bays. The bottom sill is a 2-by-6, and a 2-by-8 is used for the top sill. The collector frame components are attached to the building with lag screws driven into them from the inside.

The collector is glazed with clear Suntuf corrugated polycarbonate panels. The manufacturer applies an ultraviolet-resistant coating to the panels' sun-facing side to extend their life. I used 10 panels, each 26 inches wide by 8 feet high. Pairs of panels are overlapped and joined over a 1-by-1-inch vertical wood strip to make the 4-foot-wide panels for each bay. Two 1-by-1-inch horizontal members provide additional support for the glazing. (See the illustration on Page 70.)

The absorber, a black metal window screen, is installed on battens fastened vertically to the uprights and across the top and bottom of the bays, about halfway between the glazing and siding (see photo, Page 70). After measuring thermal performance with one, two and three layers of screen, I found that two layers work best. The top and bottom vents are simply holes cut through the building's sheathing and siding. Simple flapper valves made of light plastic sheeting prevent backflow through the upper vents at night.

In summer, the vertical orientation of the panels and the high sun angle minimize overheating, but you should block the top vent openings

LEN CHURCHILL; PAGE 66: GARY REYSA

The author checks airflow (above). The collector is built from the simple materials listed at left.

to prevent the collector from delivering heat. I just staple a piece of cardboard over each top vent, but you could install hinged vent doors. Shading or covering the panels also would work, but is probably unnecessary. In the spring and fall seasons, you can close some vents and leave others open to control the heat output.

Construction Tips

First, measure your building's south wall to determine how you'll need to adjust the collector design. Pay particular attention to available height and to stud spacing. Next, lay out the vents. Offset them from the wall studs enough to leave room for the vertical frames to be placed away from studs and lag-screwed from inside the building. Mark the vent locations on the inside and outside of the building to ensure you have no conflicts with electrical wiring. After you're certain the layout is correct, take a deep breath and cut the vents.

Cut the top sill long enough to lap over the end verticals by at least 1 inch. Bevel the back edge of the top sill so that it slopes about 10 degrees when fitted against the siding, allowing it to shed rain.

Next, cut the verticals, angling their tops to match the slope of the top sill. Line them up, and then cut notches for the two 1-by-1-inch horizontal glazing supports.

Next, prime and paint everything. You don't have to repaint the siding that will be behind the collector, but painting it a dark color will improve the efficiency slightly. Keep in mind that a muted version of this color will show through the collector screen, so be sure that the color you choose meets your aesthetic sensibilities.

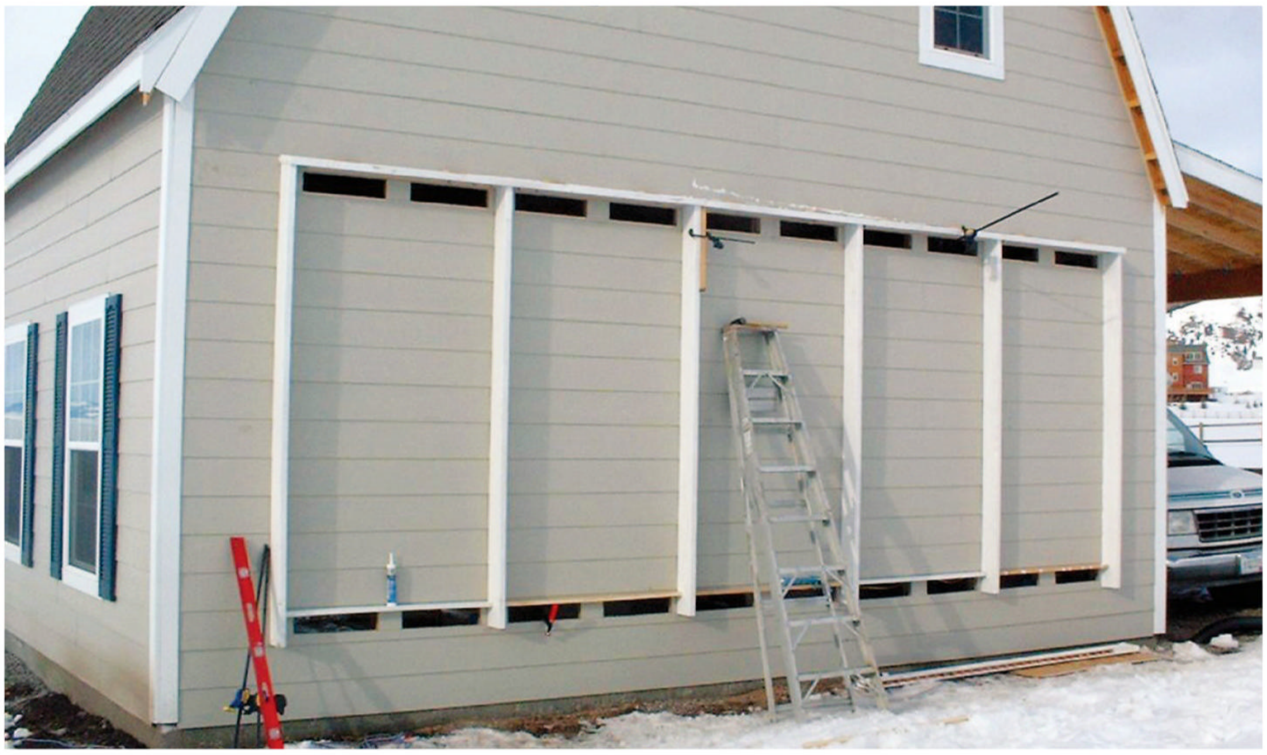
After the paint has cured, mount the verticals to the siding. I fastened them from the inside using 5-inch lag screws, with washers, through the wall sheathing and siding. If your siding is not strong enough to support the weight, align the verticals with the wall studs and drive lag screws from the outside through them and into the

Collector Materials

This list shows what I used and my costs (in 2004), and should help you figure totals for your installation:

2-by-6 lumber (verticals, bottom sill)	68 ft.	$42
2-by-8 lumber (top sill)	22 ft.	$18
1-by-1 lumber (glazing supports)	130 ft.	$15
Suntuf 8' x 26" corrugated polycarbonate panels*	10	$160
Foam closure strips*	40 ft.	$10
Screws with EPDM washers*	200	$10
Black metal window screen	4 x 70 ft.	$70
Paint, caulk, lag screws, hardware cloth, etc.		$25
Light plastic sheet (vent flappers)		free
Total		**$350**

*Your hardware store may need to special order some of these items from the manufacturer: Palram Americas; 800-999-9459; *www.PalramAmericas.com*.

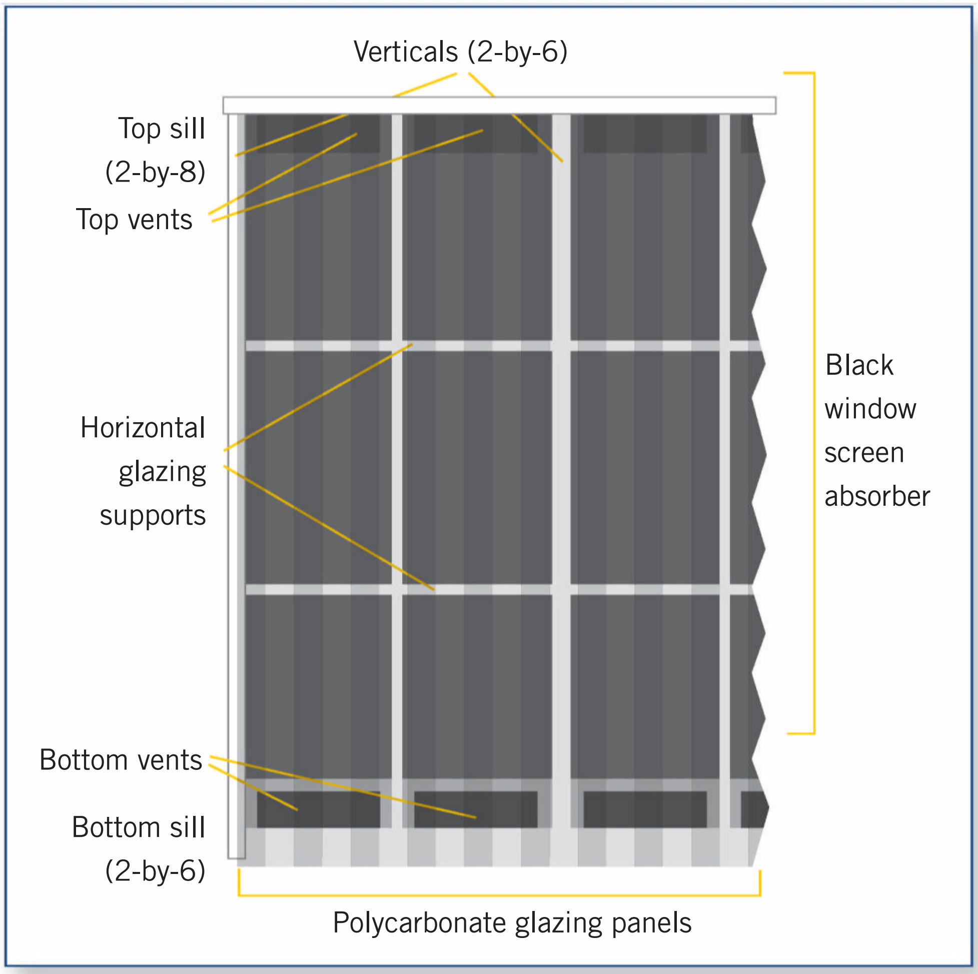


The frames for the solar collector are mounted on the outside of the wall siding.

GARY REYSA (2); TOP RIGHT: JOAN REYSA

studs. Take care to keep everything level, plumb, and straight — this will save you a lot of four-letter words later.

Now, attach the top and bottom sills. If desired, install sheet metal flashing above the top sill to repel rain. Then, seal the perimeter of the collector frame with silicone caulk. Mount the battens and staple the window screen absorber onto them. Fold over the edges of the screen to fit in the bays, which are slightly less than 48 inches wide.



Make your 4-by-8-foot glazing panels by joining pairs of the 26-inch-by-8-foot corrugated panels. Overlap the panels by one corrugation, applying a light bead of silicone caulk between the overlapped sheets. Reinforce the joint by fastening a 1-by-1-inch wood strip on the inside of the overlapped corrugations using screws with washers made of EPDM, a synthetic rubber that stands up to sunlight as well as both high and low temperatures. Install the horizontal 1-by-1-inch glazing support strips in the notches cut into the collector frame. The surface of the strips should sit flush with the surface of the frame. Do any cleanup, caulking or other work inside the collector frame at this point. You won't be able to reach inside after you attach the glazing.

Next, mount the glazing panels. Install foam closure strips — which are molded to fit the contours of the corrugated panels — on the top and bottom sills. Run caulk beads on the first set of verticals and mount the first glazing panel section. (You'll quickly find out how square your frame is.) Securely fasten the panel sections to the frame using screws with EPDM washers.

Install the rest of the sections in the same manner. Overlap each new section over the previous section by one corrugation, using a bead of caulk in the overlap.

For the flapper valves on the inside top vents, I went high-tech and used two thicknesses of a plastic garbage bag. Before adding these, attach half-inch mesh hardware cloth over each vent to keep the flappers from being sucked into the vent. Then, staple the flappers along the top edge of the vent, just above the vent opening.

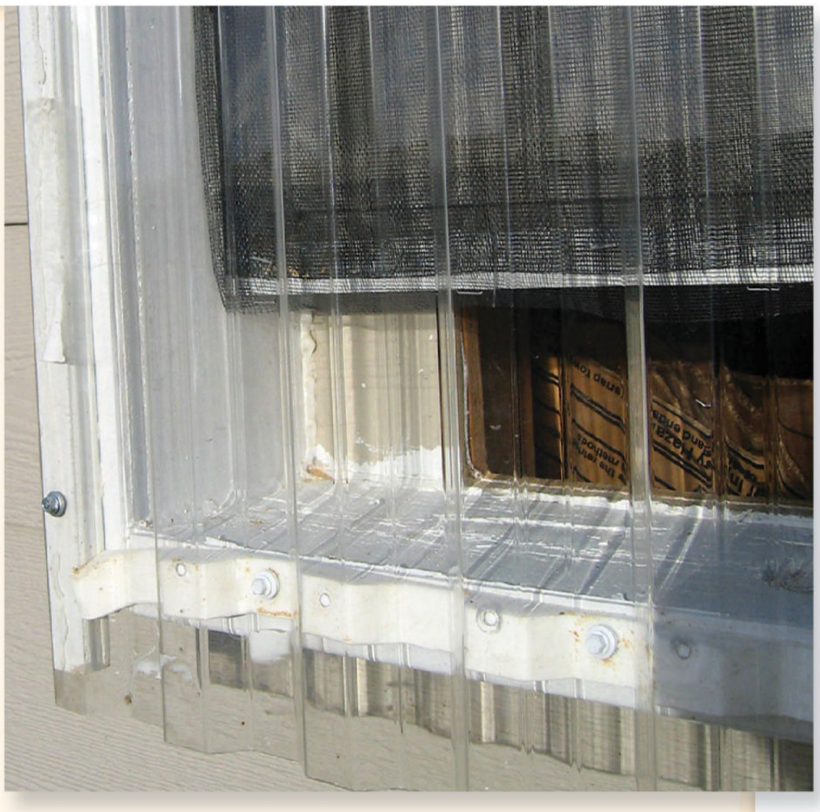
Solar Collector Pros and Cons

Pros

- Simple (not much to go wrong or watch over)
- Easy to build and does not require changes to the building structure
- Long life and little maintenance (so far)
- Very low initial cost (less than one-tenth the cost of most commercial panel options)
- Good economic return on the initial investment
- Reduces our greenhouse gas production by about 1,800 pounds per year
- Output can be adjusted by opening and closing vents, and summer output can be reduced to zero
- Does not affect use of building (I can still pile stuff against the wall, but now it's not junk — it's thermal mass)
- It's not ugly (or at least not too ugly!)

Cons

- It hurts a bit to cut holes in the wall (but you'll get over it)
- The building may require additional thermal mass and insulation to keep inside temperatures from dropping too much at night.



This close-up through the polycarbonate shows the absorber screen, the foam closure strips, screws with EPDM washers, battens, and a bottom vent.

Collector Options

A couple of variations could improve the system's performance. Substituting dual-wall polycarbonate glazing for the single corrugated sheet would reduce thermal losses through the glazing (although some loss in energy absorption will occur). This type of glazing, which consists of two sheets of polycarbonate separated by support webs, also simplifies installation, because it requires less support and doesn't have corrugated edges that require sealing. Buildings in cold climates will benefit the most from this change, which would increase the cost by about $100.

Another option is alternating collector panels and windows on the south wall. This approach would admit more light and some direct heat gain through the windows, and would do so without the glare, high losses, and overheating that accompany full window walls.

You can use the same concept to heat a house or cabin.

With some refinement to integrate the vents with the interior wall, the same basic design can provide daytime heat to living spaces. One caveat: The National Mechanical Code prohibits circulation of conditioned air warmer than 120 degrees in wooden stud spaces. While this may not pose a problem for outbuildings, in buildings used for human habitation, consider constructing the collector with metal rather than wood studs.

As an extra measure of safety, wood areas immediately surrounding the exit vents could also be flashed with sheet metal.

In altering the collector design, make sure you don't violate the following guidelines:

- The collector's depth should be at least $^{1}/_{15}$ of its height.
- The absorber must offer low resistance to airflow.
- The vent area should be at least 50% of the collector's horizontal cross-sectional area.
- The air path through the collector should be as shown in the "How It Works" diagram, Page 68.

PAGE 70: GARY REYSA; DRAWING: MATTHEW T. STALLBAUMER

Heat Gain: Running the Numbers

In a recent test I did at midday under typical sunny winter conditions, the collector produced a 50- to 60-degree temperature rise between the lower vent and the upper vent, and an average air velocity at the upper vent of 110 to 120 feet/minute. Peak output was 25,000 Btu/hour, and the total daily heat gain was about 130,000 Btu (38 kilowatt-hours). This is equivalent to burning about 2 gallons of propane (about $4 worth) at 70% efficiency.

Heat gain estimates are based on measurements of the temperature rise and the vent exit velocity. Combining these with the specific heat of air and the density of air gives the collector heat output. I estimated the rate of heat gain using the following equation:

$$G = A \times V \times D \times (T_u - T_l) \times H$$

G is heat gain rate; *A* is vent area; *V* is velocity of air through the vent; *D* is air density at prevailing temperature and altitude (you'll have to look this up); T_u is air temperature at the upper vent; T_l is air temperature at the lower vent; and *H* is the specific heat of air (a measure of the heat required to raise the temperature of a pound of air 1 degree Fahrenheit; it varies with temperature and pressure but is about 0.24 Btu/lb-F° under everyday conditions).

I measured the temperatures with several $2 Taylor thermometers from the hardware store. The vent exit velocity was taken using a Kestrel wind meter. Although this instrumentation might not meet Sandia National Laboratories' standards, I believe it does provide a solid estimate of the collector's performance.

Other Ways to Construct a Collector

This collector could be built with less material and lower cost if it were integrated with the wall during initial construction. It could also be built on the outer surface of the wall, omitting the exterior siding behind it. This might save up to $2 per square foot. For a more finished appearance, you could install a higher grade of sheathing in the collector area.

For a more integrated approach, the wall stud cavities could be used for the collector itself. Using standard 2-by-6 studs at 24-inch spacing, inlet and exit vents could be incorporated in the inside finished wall, with the absorber screen mounted about halfway back in each stud cavity. The collector side of the inside finished wall could be lined with polyisocyanurate foam board insulation, which withstands high temperatures and provides high R-value at modest cost. The R-value of the insulated collector wall would be comparable to that of a standard wall. The glazing could be mounted on 2-by-2-inch members extending along the top and bottom of the collector, and over each of the vertical studs in the collector area.

The difference in materials cost between such a collector and a conventional wall would be close to zero! With a large collector, diagonal bracing or a shear-resistant inside wall may be required to maintain the wall's shear strength. Be sure to work out an agreement with your municipal building department on the details.

Other approaches surely are possible. If you work out a good one, I'd love to hear about it. Meantime, here's to your warmth and comfort!

Gary Reysa was a product development engineer for Boeing Aircraft. Since 2000, he has lived in Montana, where cold winters, high heating bills and ample sunlight sparked his interest in solar heating. Send your questions about this article or project to Gary@BuildItSolar.com. He has posted many other DIY solar projects on his website, *www.BuildItSolar.com.*

Reap the Garden & Market Bounty
HOW TO DRY FOOD

Dry the harvest to stock up on homegrown snacks and convenience foods for year-round eating.

By Barbara Pleasant

Many gardeners freeze, can or give away surplus zucchini and tomatoes, but what about drying them? Not only is drying a delicious way to preserve and concentrate the flavors of your fruits, veggies, and herbs, but if dried, produce requires little space—and no electricity—to store, so you can enjoy it in fall and winter, too.

Last year I dried peppers, squash, garlic, and quite a few cherry tomatoes, which brought much comfort when a power outage pushed my frozen treasures to the brink of thaw. The biggest revelation came in early spring, when I began using dried foods as other stockpiled veggies ran low. I discovered that cooking with home-dried foods is as easy as cooking with packaged convenience foods, at a fraction of the cost. Sweet dried fruits and crunchy veggies are great in meals, but they're good enough to enjoy as snacks, too.

What can you dry? From tomatoes and beets to sweet corn and green beans, almost any vegetable that can be blanched and frozen is a likely candidate for drying, along with apples, strawberries, peaches, and most other fruits. In times past, people waited for a spell of dry, breezy weather to dry bunches of herbs or peppers threaded on a piece of string. The first dehydrator I ever used was a parked car (just lay the goods on the dash or under the rear window). You will need

If you don't have a garden, stock up on in-season produce from a farmers market to dry at home. You can dry almost any fruit or vegetable you enjoy eating.

DAVID CAVAGNARO (2); TOP RIGHT: EBEN FODOR

only a warm oven to dry a basket of shiitake mushrooms, but unless you live in an arid climate where sun-drying is practical, you'll eventually want a dehydrator. David Cavagnaro compares plug-in options in "Choosing a Food Dehydrator" (*www.MotherEarthNews.com/New-Dehydrator*), and Eben Fodor shares his expertise on how to build simple, nonelectric food dryers in the article "Build a Solar Food Dehydrator" (*www.MotherEarthNews.com/Food-Dehydrator*). *(For more options, see* www.MotherEarthNews.com/Solar-Food. *—MOTHER).*

But back to the food. Do you want the simplicity of scalloped potatoes from a box—but homegrown? Or how about the makings for dozens of pasta salads in which everything but the noodles came from your garden or a local farm? With a stash of dried foods you really can drag through the door after work, set some dried veggies to soak, and then flop down for a few minutes, talk to the kids or change your clothes. By the time you're back in the kitchen, you'll be greeted by plump, pre-cut, organically grown veggies ready to be stir-fried, sautéed, simmered, or tossed with dressing for a fast salad. You'll see that drying foods to stockpile is one of the easiest ways to achieve a local diet.

Back to the money. Organic convenience foods have their place in busy lives, but you pay for the time and energy involved in their creation. You subsidize the growing, drying, packaging, shipping, and marketing, and it all adds up to some hefty retail prices. A dried organic vegetable soup kit costs $2 to $3, and a frozen entrée can push $5. The organic "skillet dinner" category runs somewhere in between, and it's a great example of a situation where you could make your own for about 50 cents using home-dried foods.

Drying peppers and herbs can save you big bucks at the spice rack, too. And if you make your own smoky sweet paprika or hot pepper blend, your cooking improves as you discover new ways to use the blends to punch up your favorite dishes.

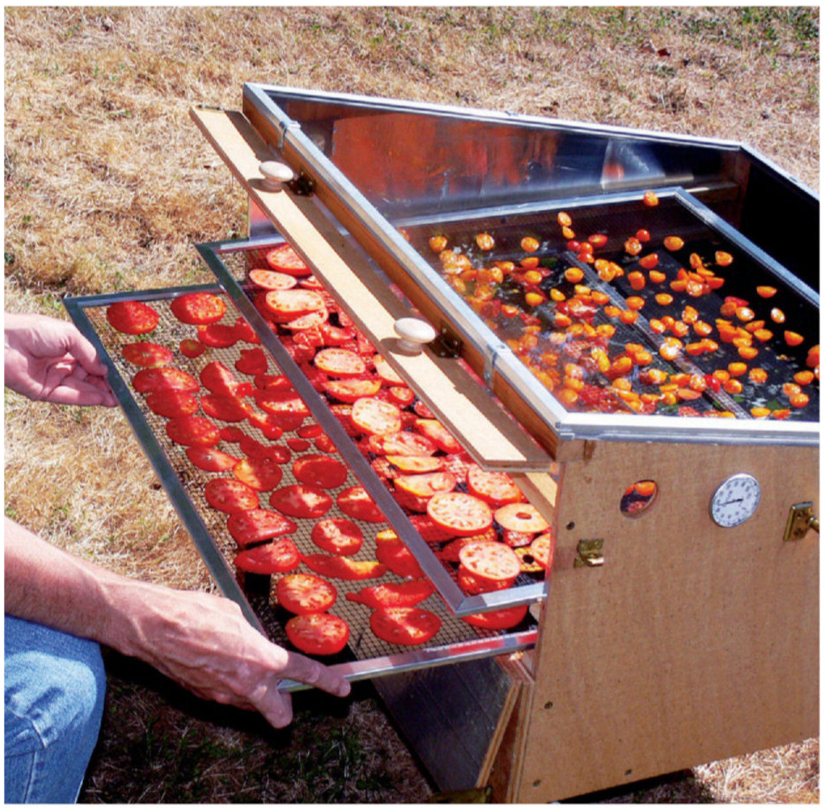
Drying with Attitude

In Lanesboro, Minnesota, organic gardener and food-drying expert Mary Bell thinks people should look at food drying with a creative eye. Bell has invented what can only be called new foods, such as succulent "half-dried tomatoes" seasoned with basil and thyme or "Can't-A-Loupe Candy"—chunks of cantaloupe seasoned with ginger and powdered sugar before drying. To deal with bountiful crops of hard-to-preserve eggplant, she figured out how to cut eggplant into strips, soak them in a salt/lemon juice solution, and dry them into pasta-like strands. For overripe zucchini, she marinates thin slices before drying them into chips.

According to Bell, the principle behind her book *Food Drying With an Attitude* is sustainability. "I want everybody to have food they can supply for themselves year-round," Bell says. "Drying can provide a way to use things you already have instead of buying from some other place." Bell removes ribs from big kale leaves, dries them raw, and crushes them into a jar to use as all-purpose potherbs.

She also sells them at her farmers market booth alongside her locally famous fruit leathers and dried tomatoes—a springtime treat that satisfies customers' appetites for fresh flavors.

"If people are given permission to try new things, they are often surprised at what they can dry—such as marked-down bananas at the store," Bell says, adding that drying food is a simple skill to master.


Tap free solar energy to create amazing sun-dried tomatoes.

Food Drying Is 1-2-3 Easy

1. Slice or dice food into small, uniform pieces.

2. Dip the pieces in an acidic solution or blanch them to enhance the quality of the final product.

3. Place the pieces in single layers to dry, and turn as needed to help them dry more quickly.

Most vegetables are dried to a crisp, but fruits are done when they become leathery. Bell points out, however, that there is plenty of room in between, such as savory chunks of half-dried tomatoes. If you want to try drying using only a sunny windowsill during the day and a warm (from the pilot light) oven at night, start with veggies that can be dried raw—garlic, mushrooms, cherry tomatoes, and peppers—and fresh greens such as kale or chard. First wash greens in cool water, then pat dry between towels.

Onions, okra, horseradish, and many herbs are dried raw, too, but don't wait until your onions get soft. Instead, select those that may not store well.

As I harvest garlic, I set aside the best bulbs for replanting, and then dry some of the rest. When the fresh garlic runs out (usually in February), the dried garlic fills in until the new crop is ready.

The high sugar and acid content of apples, pears, and peaches makes them great candidates for dip-and-dry treatments, in which cut pieces are dipped in an acidic solution to stop the oxidation process that darkens them. Orange, pineapple, or cranberry juice work well, and you can drink the leftover juice when you're finished. You may like the flavor enhancement from using pineapple juice, or the colors you get from letting apple slices soak in cranberry juice for an hour before drying. Some vegetables also darken when dried, but that's easy to prevent by soaking the pieces in a mixture of one part lemon juice to four parts water.

Check Your Berries

If you want to replace the organic trail mixes you've been buying with a homemade version, go for it! Blueberries, cherries, cranberries, seedless grapes, and figs do require extra steps to get great results, but if you can boil water, you can dry them.

After they've been washed, drained, and pitted if necessary, "check" the fruits by dipping them in rapidly boiling water for two seconds, or pour boiling water over them for a count of four. After the water drains away, spread the fruits on cookie sheets, pat dry, and pop them in the freezer for 1 to 2 hours. Then take them out and dry them right away. The boiling water cracks the skins and the brief freezing

Drying Tips

Make creative cuts. Try using an egg cutter or other unusual blades to slice mushrooms or carrots into attractive serrated slices or matchsticks before drying them. If you do a lot of drying (or pickling), a manual mandoline slicer can be a huge timesaver.

Do it outside. When using an electric dehydrator, run it outdoors—in a place protected from rain—to avoid heating up your kitchen. Or run it at night.

Dry on a shrub. If you suddenly need lots of space to dry a tree's worth of apples or pears, spread an old sheet over a dense bush (such as a boxwood), spread out the fruit, and cover it with cheesecloth to keep out insects. With good weather, the fruits will dry in two days. At night when it's damp, bring the fruit indoors and spread it on an unused bed or table.

Make fruit leathers. Cut them into kid-pleasing roll-ups by combining equal parts of any fruit purée with thick applesauce before drying on lightly oiled sheets. A small amount of gelatin mixed into the fruit mixture helps leathers set up and dry more rapidly.

Powder your culls. Dry onions, garlic, asparagus, snap beans, and other vegetables, then grind them into a vegetable powder. Mixed with a little water or oil, vegetable powders work like vegetable bouillon. Use a small coffee mill to chop dried vegetables and herbs into coarse pieces or fine powders.

Pick up your scissors. Before rehydrating dried tomato or zucchini slices, cut them into smaller pieces with kitchen shears to help them plump up faster.

Get wet. When cooking, add dried vegetables to the moistest part of a dish. For example, sprinkle dried tomatoes and peppers over the sauce layer of a pizza rather than on top of the cheese.

EBEN FODOR (2); PAGE 75: BOTTOM, CLOCKWISE FROM LEFT: RICK WETHERBEE; DAVID CAVAGNARO; EBEN FODOR; TOP, CLOCKWISE FROM LEFT: ISTOCK/DEBRA WISEBERG; RICK WETHERBEE (2)

Many herbs can be dried simply by hanging them upside down (above). We heard it through the grapevine: You don't have to have California sunshine to make great raisins (right).

breaks down cell walls, transforming the fruits into incredibly tasty nuggets for snacks, cereals, or baking. Try drying them halfway, to the chewiness of raisins, which will require refrigerated storage because of their high moisture content. Fruit dried until near-crisp can be stored in any cool, dark place. To rehydrate, just soak it in water for an hour before eating.

Steaming and Blanching

When preparing veggies for drying, blanch them in boiling water, or better yet, use a steamer to limit their uptake of water and fix enzymes. Broccoli florets and carrot slices that are steam-blanched and dried transform into soup in minutes (just add stock), and rehydrated steam-blanched green beans almost pass for the freshly picked version.

Sweet corn dries beautifully, too, and it's easiest to handle if you blanch the whole ears before cutting off the kernels. Instead of blanching beets, winter squash, and pumpkins, roast them until almost done before peeling, cutting into slices or chunks, and drying them.

Lots of foods lend themselves to drying, and several methods can get the job done. Clockwise from left: dehydrator-dried parsley, oven-dried basil, and sun-dried tomatoes.

Simple, Safe Storage

Many foods that seem to be dried to perfection when you stash them in airtight containers may surprise you by going soft again as moisture levels equalize inside the container. Putting the pieces back into the dehydrator for an hour or two will fix the problem, making it possible to store the food at cool temperatures for up to a year. Keep chewy cherries, half-dried herbed tomatoes, and other dried foods that are slightly moist in your refrigerator or freezer to prevent mold. Freezer storage also is a good idea for foods dried outdoors because it will kill any insects hiding in crevices.

Prepare to be amazed at how little storage space you require. I can fit 5 big zucchinis, 3 butternut squash, 12 fat garlic bulbs, and 20 pounds each of tomatoes and peppers on one basement shelf after they're dried. I never have to worry if the power stays off for days, but best of all, I always have something fast and easy to cook that came from my own organic garden. Of course, non-gardening cooks can also stock up at the farmers market when harvest is high and you're likely to find the best deals. It's a great way to support local farmers now, save money, and keep eating delicious local foods all winter long.

KEEP A FAMILY COW
to Enjoy Delicious Milk, Cream, Cheese, and More

Have a cow! Here's what you need to know to buy and care for a dairy cow. You'll have a blast, plus save money on dairy products (and even meat).

By Karen Keb Will

A dairy cow provides lots of practical benefits. Perhaps the most notable is that cows eating a grass-based diet can provide great-tasting dairy products that are more nutritious and flavorful than those you can buy in most grocery stores. Raising a family dairy cow is a fun experience, plus it's a great step toward self-sufficiency and food security. Surplus dairy products from the cow and meat from calves could even bring in extra income for your family. We estimate one cow could produce almost $6,000 a year in grass-fed dairy products and meat (see "Annual Budget for Keeping a Family Milk Cow," Page 77). Keeping a homestead dairy cow is a big commitment, though, so you'll want to prepare carefully.

The Daily Routine

A cow produces milk to feed her calf. After the cow has given birth, she must be milked (or her calf allowed to nurse) at least twice daily or the milk will stop flowing. Count on about 9 to 10 months of milk production, allowing the cow to rest at least two months before a new calf is born.

Your daily routine will consist of feeding, milking twice a day, or milking once a day and separating the calf from the cow 8 to 12 hours before you milk. (Keep reading for more details.) You will also need to muck out the milking area frequently and move fences for rotational grazing as needed.

Dominic Palumbo leads his cows (a Normande and a Jersey-Angus cross) to pasture near Sheffield, Massachusetts (left). If you allow a calf to nurse instead of milking the cow twice a day, you'll save time on chores (right).

Feeding. A dairy cow needs two principal components in her diet to be healthy: roughage and protein. Roughage mainly consists of cellulose and can be supplied by pasture and various forms of hay. Good grass hay and grass pasture can contain sufficient protein for animal maintenance, but for a lactating dairy cow, higher-protein feeds such as alfalfa hay, grass-legume pasture, or protein supplements will increase milk production. She'll also need a mineral supplement and salt, and a lactating cow can drink up to 30 gallons of water per day, so you'll need to provide plenty of fresh water.

In winter when the pasture is sparse, good hay—and possibly additional grain or premixed feed—will be necessary. If you can feed leafy alfalfa hay (2 to 3 pounds per 100 pounds of body weight), this will be all she needs. However, if you want to increase the cow's milk production, you should feed a grain supplement in the form of chopped or ground oats, barley, corn, or wheat every day, regardless of season.

During the summer, the cow can get all the nutrients and protein she needs from grazing a lush pasture consisting of legumes and grasses. In many regions, a cow and calf will need at least an acre of good pasture. In regions with poor soil or little rain, 10 acres or more may be necessary to support the pair.

Milking. Ideally, milking should be timed at 12-hour intervals. A cow with a full, distended udder is not a happy cow; don't inflict this on her by milking erratically. With the family cow, you have the option of milking just once a day by letting the calf help you out. Leave the calf with the cow overnight. Separate them in the morning, and by evening, the cow will be ready for milking (this approach lets you avoid early morning milkings if you have an 8-to-5 job). Using this system, the calf may nurse beyond normal weaning periods (about eight weeks for most dairy calves), and you won't need to mess

ISTOCK (2); PAGE 76: JASON HOUSTON

Annual Budget for Keeping a Family Milk Cow

There are variables in a budget for a family milk cow, but after you own the cow, have summer pasture, install the fence, and have basic equipment, the primary cost on an annual basis will be for feed. Bull rental (or semen), vet bills, and supplements are also variable costs. But the one-year estimates below, calculated in 2010, show that keeping a cow can save you money compared with buying milk and meat at retail prices.

You can "stockpile" some of the pasture, saving it for winter grazing, but to maintain health and production, you'll usually need to supplement the cow's diet with high-quality hay when grass isn't growing.

Calves raised for beef are usually slaughtered at about 2 years old when they're approaching 1,200 pounds. But you can take advantage of summer pasture, and make or buy less hay, if you butcher the calf right before winter, when the calf is about a year and a half old and probably weighs about 700 pounds.

Cost of alfalfa hay: $810

Assumes 42.5 pounds x 200 days; $190 per ton in small, square bales.

Value of milk available for human consumption: $3,000 to $5,215

3.5 gal. x 270 days = 945 gal.; a bottle-fed calf drinks 200 gallons in about two months before weaning; net 745 gal. at $7/gal., compares to premium, locally produced milk. Even with a more conservative $4/gal., the value of milk would be about $3,000. If you milk only once a day and allow the calf to nurse instead of feeding it with a bottle, the calf will drink more milk daily and can be weaned when it's 8 or 9 months old. In this situation, you could expect about 470 gal. of milk for human consumption.

Value of grass-fed meat: $1,575

700-pound calf at 18 months old, producing 350 pounds of meat at $4.50/lb.

Annual value: $3,765 to $5,980

—Troy Griepentrog

Milking can be a rhythmic, relaxing routine (left). Strain milk before cooling it (above).

JASON HOUSTON (2)

around with the bottle feeding that would be required if you were milking twice a day and feeding some to the calf.

Dairy breeds can produce up to 8 gallons per day, although 3 gallons is more typical for a family dairy cow on a grass-only diet. The calf only needs about 5 quarts to 2 gallons per day if it has access to good pasture as it grows. You can assume the calf will drink half the cow's daily production if you keep the two together about 12 hours a day.

Washing the cow's udder before milking will help relax her. Equipment (and your hands) should be scrupulously clean, too. Several books, websites, and online videos explain the process of hand-milking a cow (see "Resources," Page 79).

After you have the milk in a bucket, you'll need to quickly strain it to remove debris and cool it to limit bacteria growth. To strain the milk, you can purchase a commercial milk strainer and paper filters, or pour the milk through four layers of dish towels or cheesecloth over a large colander and bowl.

If you prefer to pasteurize milk, do this after straining, but before cooling. The easiest method is to use a home milk-pasteurizer machine. These machines can be purchased for about $300 for a 2-gallon unit. For pros and cons on raw milk go to "Raw Milk and Your Health" at *www.MotherEarthNews.com/Raw-Milk-Debate*. For an easy stovetop method, check out "How to Pasteurize at Home" at *www.MotherEarthNews.com/Home-Pasteurize*.

> Dairy breeds can produce up to 8 gallons of milk per day, although 3 gallons is typical.

Breeding and Birth

Soon after giving birth to her first calf, your cow will need to be bred. She will "freshen" (have a calf and start producing milk) about nine and a half months from the date she "settles" (gets pregnant); her second heat after calving is an ideal time to breed her. For the strongest calves, time the birth when spring pastures are lush. You will be milking (and her calf may be nursing) until the last two or three months before the cow gives birth. At that time she'll need to be "dried up" (stop being milked) to allow her body to prepare for her new calf.

You don't need to own a bull to breed your cow. Your options include taking her to a bull for breeding or artificial insemination (AI). The easiest method will undoubtedly be AI, unless your neighbor just happens to have a suitable bull and you can walk your cow over for a visit. You can hire an AI technician to do the job, or take a course and do it yourself. Another breeding option is to raise or buy a yearling beef-breed bull and have it processed after your cow is bred.

If you intend to raise your calf for beef, breed your cow to a smaller beef-type bull, such as an Angus. Either way, you'll want to select a bull that roughly matches the size of your cow — anything larger and she may have trouble birthing a large calf. Dairy breeds usually calve easily, but make sure you're prepared for problems.

If you want homegrown, grass-fed beef, you can raise the calf until it reaches appropriate slaughter weight (typically about 1,200 pounds, but smaller if you prefer) at about 2 years old, and take it to a processor who will butcher and package the beef. You can also sell or give away the calf as a bottle baby for a local 4-H project.

Fencing and Facilities

Although you could tether your cow to a stake and move it daily, it's a bit risky for

Dairy products from your own grass-fed cow are nutritious and tasty!

the cow. She could get tangled in the rope and be injured. If you can keep an eye on her most of the day while she's tethered, it might be worthwhile so you won't have to invest in fencing. Usually, building a perimeter fence is the best option.

The best way to keep cattle on grass is with a rotational grazing system. This process involves dividing pastures into small paddocks and controlling the cow's access to fresh grass, often using an electric fence that you move every few days. Lush grass grows back in the recently grazed pasture while the cow is grazing a fresh section.

For interior fences and paddock dividers, one strand of electrified high-tensile wire works effectively on cattle that are trained to respect electric fences. If you plan to raise calves in those same paddocks, however, then 2 or 3 wires will be more effective.

Dairy cows require modest shelter against cold winds and rain or snow. A simple shelter can be constructed from recycled materials such as old telephone poles, plywood and corrugated metal.

An outbuilding with a concrete floor that can be kept relatively clean and sanitary is ideal for milking. You can halter and tie your cow to a vertical post if she's gentle, or use a stanchion to restrain her. Especially gentle and experienced cows can be milked standing in the field.

Get Your Dairy Cow

A cow of any good dual-purpose breed (Dexter, Red Poll, Milking Shorthorn, Randall Lineback, or others) will produce a good beef calf, provide it with enough milk, and produce more than enough milk for most families' needs. Veterinarian D. Phillip Sponenberg says, "For home dairy use, a number of the heritage breeds make a lot of sense. They thrive on average pasture and produce plenty of milk for home use, and owners with even a single cow can make real and important contributions to the conservation of these genetic treasures that we may well need for future agricultural needs." (For more on heritage-breed cows, check out The Livestock Conservancy online at *www.LivestockConservancy.org*.)

Ask around in your circle of rural friends, the local extension office, or farm stores for advice on finding cows that are for sale in your area. You may find your cow or cow/calf pair at a local dairy farm, or check on Craigslist (*www.Craigslist.org*). If you don't have experience with cattle, try to buy an older cow with a placid nature.

If you have a knowledgeable neighbor or friend, take her or him with you when looking at a cow that's for sale.

Before buying, do a visual inspection and ask lots of questions: How old is she and how many seasons has she been milked? Has she been hand-milked or machine-milked? Is there proof that the cow is tuberculosis- and brucellosis-free? Has she had calving problems? Does she have any health or behavior problems? If possible, milk her yourself or watch her being milked and examine the milk for signs of mastitis: stringy milk, clots, or blood.

If you want a particular breed, check the classified ads in rural-lifestyle and farming magazines, or go to that particular breed's association website and locate a breeder within a reasonable distance.

RESOURCES

The Family Cow by Dirk van Loon; Includes instructions and step-by-step illustrations for hand-milking a cow.

Getting Started with Beef and Dairy Cattle by Heather Smith Thomas

Pasture Perfect: The Far-Reaching Benefits of Choosing Meat, Eggs, and Dairy Products from Grass-Fed Animals by Jo Robinson

***www.CStainlessLLC.com*:** Dairy and cheesemaking equipment.

***www.HoeggerFarmyard.com*:** Home dairy and cheesemaking equipment.

***www.DanshaFarms.com* and *www.UdderlyEZ.com*:** Small-scale vacuum milking systems for home dairies.

A family dairy cow can provide more than $5,000 worth of fresh milk per year.

FOTOLIA/JOHN YOUNG; ABOVE: ISTOCK/INA PETERS

Quick, Easy, and Cheap COLD FRAME

With recycled material, it didn't take long to put this project to use.

By Jacqueline Wilt

We decided to try using a cold frame to get an early start on our vegetable gardening. My father-in-law had some old sliding glass doors sitting in his shed, so we retrieved those and brought them home. Then we scored a great deal on straw from a neighbor ($2 per bale). Using these materials, we were able to quickly assemble a temporary cold frame in order to try our hand at early garden planting.

The site we used was not level, but since the ground was still frozen we were unable to level it out. We let the cold frame warm the ground and then worked on leveling out the area. The straw bales were arranged in a square, making sure they would accommodate the glass doors we had to place on top.

The glass was pretty dirty, so those were washed with vinegar and water. I made an exception to my "I don't do windows" rule. Doug made sure there were photographs to prove it.

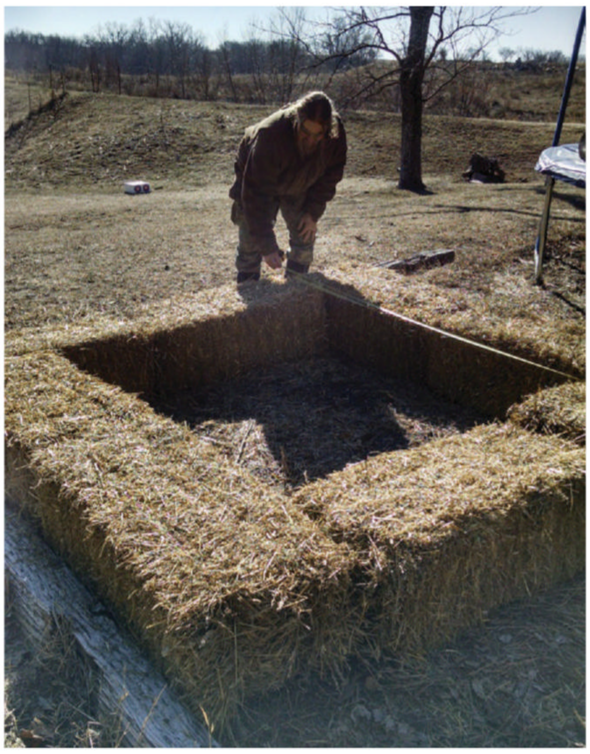
Even the chickens had to inspect the whole process. After we got it all put together, they all climbed on top of the straw bales and gleefully tossed straw all over the glass! We were busy cleaning the barn at the time, so I missed getting photographs.

We put this whole thing together in about 30 minutes (including window-washing time!) and the only cost was $16 for eight straw bales.

The site really needed to be leveled out, as you can tell the glass panels were not level. An important aspect of a cold frame is to seal out the cold out.

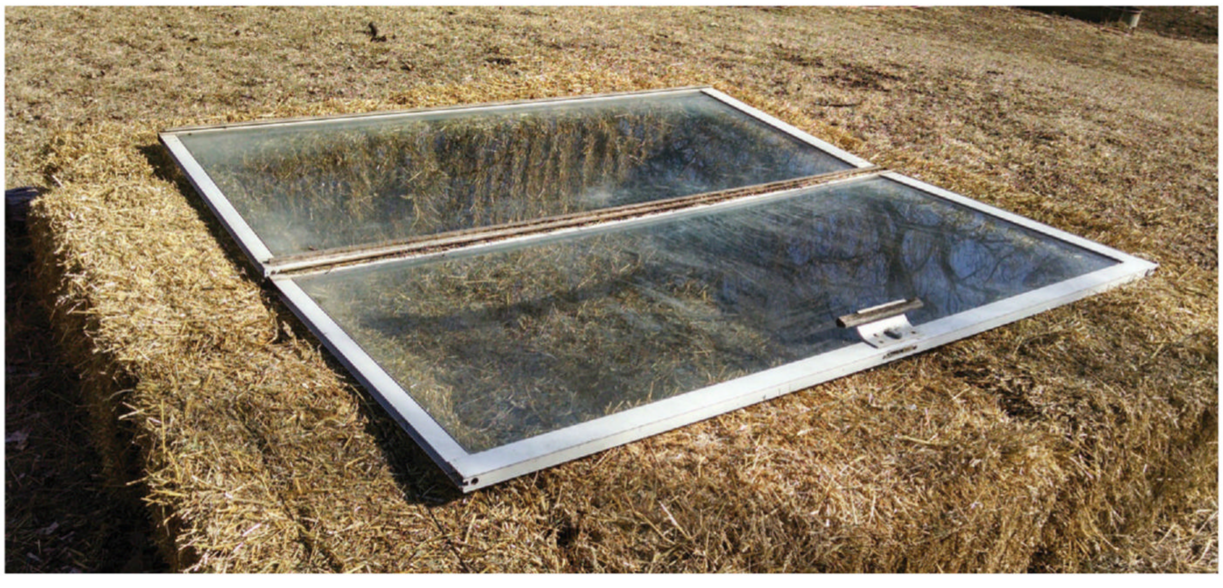
We placed a thermometer inside the bales to watch the temperature. Our plan was to break the ground under the cold frame after the ground warmed a bit. Then, we added composted soil from our barn and planted seeds once everything was in place.

I don't usually do windows, so Lizzie made sure I did it correctly.



Doug measures the bales to ensure the proper distance for the glass doors.

This curious hen had to find out what was going on!



Our finished cold frame still needs to be leveled to lock out the cold.

JACQUELINE & DOUG WILT (4)

ENJOY FRESH HERBS ALL YEAR

Why pay grocery store prices for fresh herbs when you can harvest savory snips from your garden throughout the winter?

Article and photo by Rebecca Martin

You can protect herbs from frigid temps in your garden with plastic sheeting held up by pipes.

A few steps from my porch, in a sunny spot of the backyard close to my kitchen, I harvest fresh herbs grown outdoors—in January. I use a simple season-extension device known as a low tunnel to shelter my herbs, which keep going strong even in the coldest, darkest months of my Zone 6a climate.

Rather than digging up all the summertime herbs and transplanting them into pots for overwintering indoors (where herbs begin to look anemic after about a month), I protect the plants right in my garden. The low tunnel is a rectangle of 3-mil heavy-duty plastic held above the herbs by a few arcs of plastic pipes with their ends stuck into the ground. The edges of the plastic are secured in place with sticks and old bricks. (Learn more about this easy DIY project in "Low Tunnel Construction: How to Build a Mini Hoop House" at *www.MotherEarthNews.com/Mini-Hoop-Houses*.)

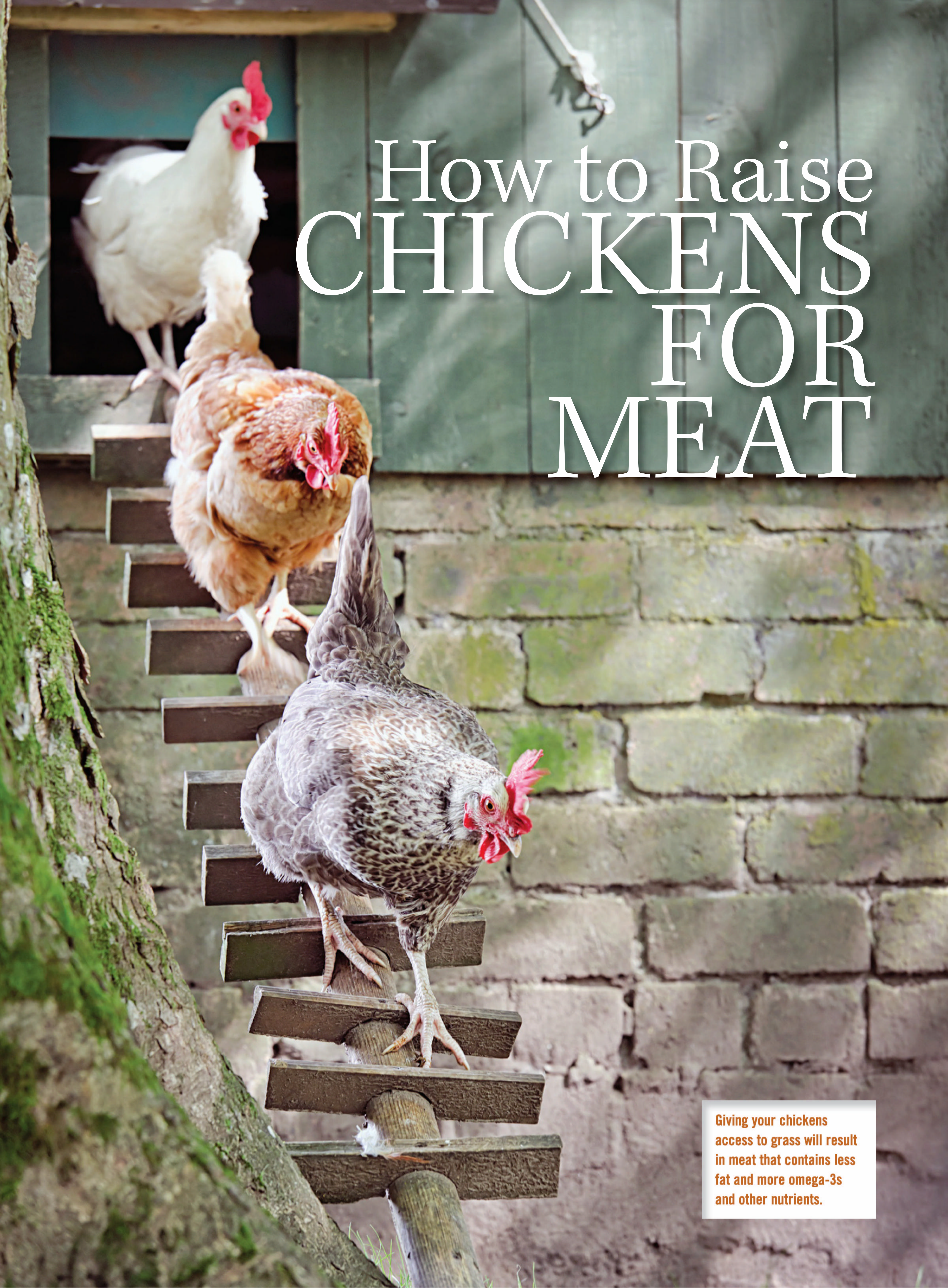
My herb tunnel measures just 3 feet wide by 6 feet long. Inside are sage (only marginally winter-hardy in Zone 6a), parsley, marjoram, sorrel, two varieties of thyme, and a few rogue garlic chives. Short dill seedlings can survive fall frosts inside the low tunnel, too, until December, when fresh garden dill is a true luxury. Parsley plants started from seed in late summer can be transplanted into the tunnel in September, giving the roots time to become established before the first freeze. Other plants that can be harvested all winter from my low tunnel are sorrel and Egyptian walking onions.

Every winter, I save about $65 on fresh herbs. Here's how I calculate the savings: Small packages of fresh herbs cost $2.50 apiece at the grocery store. Each batch of homemade stock incorporates the equivalent of a "packet" of thyme and a bunch of parsley. Omelets are garnished with what amounts to a packet of sorrel. One of my household's favorite dishes, pasta tossed with acorn squash, is dressed with a packet of butter-fried sage leaves. Christmas dinner alone can easily use up 4 or 5 packages of fresh herbs. If I had to buy all of this at a grocery store, it would cost $5 per week. Added up over 13 weeks of winter, the savings comes to $65.

By growing my own herbs year-round, I can also count on having unusual varieties available. Pungent flat-leaf parsley and tart lemon thyme can be difficult or impossible to find in local shops, but they're always on hand in my backyard. Plus, store-bought herbs are often of poor quality compared with fresh herbs from the garden, even in January and February when plants can look peaked after many nights of hard freezes.

You, too, can shield herbs from winter's frigid blasts with a low tunnel. You may have to experiment for a couple of winters to discover what works best in your area. For added protection in severe climates, try using an extra layer of plastic inside your low tunnel, held up by a second set of hoops and separated from the exterior by an inch-wide buffer zone. Stick to cold-hardy herbs that suit your cooking style and preferences. So, if you don't use sage in your kitchen, don't bother growing it inside a low tunnel. Focus instead on whatever garden-grown herbs your household prefers in home-cooked meals during the coldest season of the year.

How to Raise CHICKENS FOR MEAT



Giving your chickens access to grass will result in meat that contains less fat and more omega-3s and other nutrients.

Don't just wing it if you're new to raising meat chickens. Use our guide to fill your freezer with broilers in as little as six weeks from hatch to harvest.

By Gail Damerow

Raising broiler chickens can put meat on your table quicker and with less effort than raising any other livestock. In just a handful of weeks, your chicks will reach target weight and your larder can be stocked with meat that's tastier and better for you than anything you could buy at the grocery store. Plus, raising meat chickens lets you opt out of the profoundly inhumane industrial food-production system. The choices between hybrid or heritage breeds, confinement or free range, and conventional or organic feed are entirely up to you.

Best Broiler Breeds

Growing broilers — young chickens with pliable skin and tender meat — involves making several choices. Your first decision is whether to raise hybrid or heritage poultry breeds. The fundamental differences are the amount of time they need to grow and the flavor of the meat. The quicker your birds reach the target weight of about 6 pounds, the cheaper they are to raise overall and the more delicate the meat. The longer they take, the more they'll cost you (as is the case with heritage breeds), but the meat will be healthier and more flavorful.

White hybrids. The most efficient hybrid meat chickens are an industrial creation developed by combining White Cornish and White Plymouth Rock genetics. The resulting hybrids — the type most commonly sold at the supermarket — grow and feather rapidly. Chicks of the same age and sex grow at the same rate and efficiently convert feed into meat, reaching target weight in just 6 to 7 weeks. Their edible portion (excluding excess fat, intestines, feathers, heads, feet, and blood) is approximately 75% of live weight.

Under careful management, these broad-breasted hybrid meat chickens will consume approximately 2 pounds of feed for every pound of weight gained. Unless they're raised on range, hybrid chickens must be butchered as soon as they reach target weight, or they will develop bone ailments or die of heart failure as a result of their excessively rapid growth.

White Cornish hybrids have fewer feathers to pluck and no underlying hair-like feathers to singe off, making them easier and faster to clean than other chickens. I like roasting them with the skin intact. When I raise other breeds, I skin them because it's faster than plucking the feathers off. However, you can choose to pluck your birds regardless of breed.

ISTOCK/REHLIK; PAGE 82: ISTOCK/GEORGE CLERK

Colored hybrids. These broilers were developed for France's famous Label Rouge organic free-range chickens and adopted by some producers in the United States. Trade names include Black Broiler, Color Yield, Colored Range, Freedom Ranger, Kosher King, Redbro, Red Broiler, Red Meat Maker, Rosambro, and Silver Cross. Most strains have red plumage, but they also come in black, gray, or barred — anything but white. Their colored feathers make them less visible to predators, especially hawks, but difficult to pluck cleanly so that the bare skin appears neat. (To learn more about colored hybrids, see an article on Freedom Rangers at *www.MotherEarthNews.com/Freedom-Rangers*.)

Golden Laced Wyandottes, a heritage breed, will raise their own chicks.

Colored hybrid broilers are usually raised on pasture and grow more slowly than white hybrids — they take at least 11 weeks to reach target weight, and the chicks don't necessarily grow at a uniform rate. They eat about 3 pounds of feed per pound of weight gained because of their longer growth period and the calories they burn while foraging. Some people find the meat of colored hybrids to be more flavorful than that of faster-growing white hybrids. The edible meat is approximately 70% of live weight.

Heritage poultry breeds. If you keep heritage chickens for eggs, you have the option of hatching eggs from your own flock, keeping the pullets as future layers, and raising the surplus cockerels for meat. Delaware, New Hampshire, Plymouth Rock, and Wyandotte are heritage poultry breeds with great

Giving birds access to grass results in nutrient-rich, low-fat meat for your table.

potential as dual-purpose egg and meat chickens.

All of these breeds are good foragers and have a moderate to slow growth rate, reaching target weight in about 16 weeks. Compared with Cornish hybrids, they have thinner breasts and more dark meat. The higher foraging activity of heritage chickens results in meat that's lower in fat and firmer in texture. The meat has a richer chicken flavor because the birds are older when slaughtered.

Non-hybrids do not grow at a uniform rate and are not as efficient as hybrid chickens at converting feed to meat. Heritage chickens consume at least 4 pounds of ration per pound of weight gained, and the edible portion is only about 65% of live weight. See the chart on Page 86 for a summary of the pros and cons of raising hybrid or heritage poultry breeds for meat.

In the Brooder House

You'll need to take into account hybrids' size and rate of growth when brooding chicks. The birds eat almost constantly, rarely moving far from the feeder. They also drink a lot of water to wash down all that feed. The brooder house needs plenty of room to accommodate their body mass, as well as sufficient feeders and waterers.

The sheer size of hybrid chickens keeps them warmer than other broilers of the same age. My white hybrids are only 2 weeks old when they start panting, so I move them out of the heated brooder house into a more open area of the barn. White hybrids tend to suffer more in hot weather than most other meat chickens. In a warm climate, they're better off raised during the cooler days of spring or fall, regardless of whether they're kept in confinement or on pasture. Colored hybrids and heritage chickens are better, but none of the breeds listed previously could be classified as highly heat-tolerant.

Confinement Pros and Cons

Another important decision you'll make when raising chickens for meat is how you'll confine the birds—inside a building or within a pasture shelter—or whether you'll allow them to roam freely. Each technique requires attention to ensure the birds' health and safety.

Homegrown Chicken Could Save Your Life

Once upon a time, before industrial agriculture began keeping tens of thousands of genetically super-charged chickens in huge barns, we rarely had to fear that our eggs and chicken might be contaminated with salmonella, campylobacter, *Escherichia coli* (*E. coli*), and other potentially deadly pathogens. Sunny-side-up eggs seldom made us ill. There were small risks before, but nothing like we have now.

Salmonella sometimes lurks inside industrial eggs, and campylobacter is found on up to 88% of chicken meat because the U.S. industrial system stresses poultry in multiple ways, including those listed below, making chickens less able to resist infections.

1. First off, they are extremely crowded—a practice that keeps production costs down but pretty much guarantees that germs can easily spread through flocks.
2. Hybrid birds have been bred to develop rapidly, but at the expense of more robust immune systems. Often, the birds' organs can't develop fast enough to support their bodies. Unless they get the right amounts of exactly the right food, their legs or hearts will collapse.
3. Laying hens are bred to produce so many eggs so fast that when they are "spent" (after just two years), their bones are sometimes so brittle that the birds can no longer even be used to make canned chicken soup.

Campylobacter bacteria contaminates up to 88 percent of industrially raised chicken meat.

FOTOLIA/BRANEX; TOP AND PAGE 85: JASON HOUSTON

Indoor confinement involves housing chickens indoors on bedding and bringing them everything they eat until they're ready to harvest. This requires less land than pasturing because it only necessitates a sound shelter.

Chickens are less likely to fall victim to predators when they're housed inside a secure building. Managing them also requires less time—after the facility is set up, you need only a few minutes each day to feed, water, and check the chicks. This method is most suited to white hybrids because they don't move around much.

The shelter could be the same structure in which the chicks are brooded, if you start with a limited area and expand the available space as they grow. Each bird needs about a half-square-foot of space up to the age of 2 weeks, and 2 to 3 square feet by the time they reach harvest weight. Accordingly, an 8-by-8-foot shed would accommodate about 25 broilers.

Roosts aren't necessary. Leg injuries can occur when heavy hybrid birds jump down, and perching can also cause breast blisters and crooked breastbones. Avoid these problems by providing confined broilers with deep, soft, dry bedding instead of roosts.

Pasture shelters must be moved daily to provide chickens with fresh forage.

Pasture confinement also involves raising meat chickens inside a shelter with a feeder and waterer—but this shelter is portable, has no floor, and is moved daily to provide the chickens with fresh forage. Giving birds access to grass results in meat that contains less fat and more omega-3s and other nutrients. One study has shown that pastured-poultry meat contains 50% more vitamin A, 30% less saturated fat, and 28% fewer calories than meat from commercially raised birds.

The upside of pasture confinement is a slight reduction in feed costs, especially if you move the shelter first thing each day to encourage hungry birds to forage before they receive their morning ration. One challenge presented by this confinement technique, however, is that you need enough good pasture to move the shelter to new ground daily, and you must do it each day. As they reach harvest size, meat chickens graze plants faster and deposit a greater concentration of droppings, so they must be moved more often—sometimes at least twice a day—to maintain the health of the broilers and to avoid burning the pasture with nitrogen-rich manure.

4. The chicks are never with their mothers, which means they can't pick up the beneficial microbes they need for a healthy digestive system. This leaves a void for pathogenic microbes to move in. Studies (as long ago as 1973!) have shown that exposing chicks to manure from adult birds can rapidly confer protection against *E. coli*, salmonella, campylobacter, and clostridium. (So, if you raise chicks that are not with their mother, use a probiotic product to help them get a strong start, and expose them to adult chicken poop when they're about 4 weeks old.)

5. Laying chicks are debeaked to prevent them from pecking each other to death because of boredom in their tiny cages. They never see the light of day.

6. Industrial producers force their layers to molt all at once, as quickly as possible, by restricting their feed for several weeks. (Hens don't lay eggs while they are molting.)

7. The use of antimicrobial drugs for growth promotion disrupts birds' gut flora and increases their susceptibility to salmonella, spreading this pathogen throughout a flock.

Poultry scientists have known for decades that these intensive, inhumane practices contribute to an increased presence of pathogens in industrial eggs and meat. On the other hand, a 2006 study in the *Journal of Food Protection* confirmed that "free-range chickens on family farms are exposed to more diverse microflora than are chickens raised at commercial farms, and therefore acquire a wider array of microorganisms, including microbes that are inhibitory to campylobacters."

Deadly pathogens can spread quickly through overcrowded flocks.

Taxpayer money is now being spent to convince us that visitors should wear special suits and "disinfect" their shoes and vehicle tires before they enter poultry facilities, *including backyard coops*. And the federal regulatory agencies, often unduly influenced by the fears of Big Ag, have recently proposed requirements that Certified Organic chickens be given access to outdoor space, but that the space must be fenced and covered to prevent contact with wild birds, as a way, they believe, to reduce contamination of eggs after hens come into contact with wild bird feces.

Continuing to try to protect chickens from germs—instead of breeding birds that are strong enough to fend off disease and using more natural, less-stressful production systems—is not the right course, folks. If you're concerned about this wrong-headed proposal for organic chicken production, let your elected officials know how you feel.

—Cheryl Long

Free-range birds forage outdoors during the day and are sheltered at night.

Weather permitting, hybrids may be moved outdoors when they're as young as 2 weeks old. They tend to become pen potatoes unless they're started on forage by 3 weeks of age. Hybrids don't do well on pasture if the weather is much cooler than 65 degrees Fahrenheit or much warmer than 85 degrees, while other chickens have a wider range of temperature tolerance.

Pasture shelters are usually made of welded wire or hardware cloth stapled to a wooden frame and roofed with a tarp or corrugated aluminum. Using the typical proportion of 1.2 square feet of pen space per bird (less room than is recommended for chickens confined indoors), a 4-by-8-foot camper shell will handily pasture-confine about 25 broilers. The shelter may be designed to be moved by one person using a dolly, or by two or more people grabbing strategically placed handles.

If the land is uneven, dips along a shelter's sides can invite predators in or allow birds to slip out. In rainy weather, puddles may accumulate inside the shelter. In all cases, the broilers spend the night sleeping in their manure. For these reasons, I prefer free-ranging my pastured chickens.

Comparing Meat Breeds

Before you order a flock of chicks from the hatchery, study this handy chart comparing white and colored hybrids with heritage chickens. As you can see, the bottom line is a choice between fast growth and lower cost with hybrids or better flavor with heritage breeds. Note that these figures are averages.

	White Hybrids	Colored Hybrids	Heritage Breeds
Time to maturity	6 to 7 weeks	11 weeks	16 weeks
Feed per pound gained	2 pounds	3 pounds	4 pounds
Percentage of edible meat	75%	70%	65%
Heat tolerance	Low	Moderate	Good
Best management technique	Indoor	Free range	Free range
Flavor	Mild or bland	Rich	Richest

Free Range

In this context, "free range" means raising chickens in a portable shelter that offers daytime access to the outdoors—a system sometimes called "day ranging." The extra activity creates firm and flavorful meat, but also causes birds to eat more because they take longer to reach target weight.

Free-ranging involves less labor than pasture confinement because you don't have to move the shelter daily, but more labor than indoor confinement because you do have to move it occasionally. Unless you fit the shelter with an automatic door as protection against nighttime predators, you'll also have to shut in the chickens every night and let them out again in the morning.

A free-range shelter is generally a bit larger than pasture confinements, may or may not have a floor, and is bedded with deep litter. It may be a tarp-covered portable hoop house, or a structure built on skids so it can be relocated periodically by a vehicle or draft animal.

A portable electric fence—usually plastic netting energized by a battery or solar controller—protects free-range poultry from ground predators and confines their foraging to one area of pasture outside the shelter. The fence is moved periodically to a fresh patch until the whole area surrounding the shelter has been grazed. Depending on the size of your pasture and the number of birds, you may need to move both the shelter and the fence to a fresh section of pasture after your chickens have grazed down the original spot.

Heritage poultry breeds retain some of the foraging instincts of their ancestors, so they take to grazing quite readily. Hybrid chickens don't think highly of getting out and about unless introduced to pasture early, but they do roam more than in confinement, and the increased energy use slows their growth and makes them less susceptible to leg problems. The end result is a trade-off between faster growth and better bird health, more humane treatment and more flavorful meat.

Chicken Feed

Aside from maintaining clean bedding or providing fresh ground to forage, your main activity when raising meat chickens will be furnishing feed and water. The birds need fresh, clean water at all times to aid digestion and help prevent disease.

Many different rations are available with varying percentages of protein or energy. More protein increases growth rate, while more energy slows the growth rate and increases fat, thereby adding flavor. People who regularly raise meat chickens balance broiler ration with scratch grain or oats until they're satisfied with the end result. (Scratch is a grain mixture that provides energy in the form of carbohydrates but has a lower protein level than most grower rations.)

But the choices don't end there. Some folks want only Certified Organic, GMO-free rations. Others are happy using less expensive, run-of-the-mill farm-store feed. Most feed stores carry one all-purpose starter/grower ration, which may be used from start to finish when raising broiler chickens. Some sources offer a full line of starter, grower, and finisher rations targeted to specific stages of growth. If you choose the latter, follow directions on the label regarding when to switch from one ration to another. Each manufacturer's recommended schedule is based on the formulations of its particular rations—and probably assumes you're raising hybrid birds. For more about different chicken feed types, and to find a map showing organic poultry feed suppliers, go to *www.MotherEarthNews.com/Feed-Providers*.

Striking, Blue-Laced Red Wyandottes are dual-purpose heritage chickens.

Medicated rations contain a chemical called amprolium to prevent coccidiosis, an intestinal disease that interferes with nutrient absorption and reduces growth rate. An alternative to using a medicated ration is to have the chicks vaccinated. A vaccine stimulates the animal's natural immune system and may be used for organic or naturally raised meat chickens. Some poultry-feed brands include a probiotic formula designed to stimulate the immune system and fend off disease. If the feed you use does not include probiotics, you can purchase these as a separate supplement from most poultry suppliers.

Return on Investment

After your facility is established, your main expenses will be labor (your time), the cost of acquiring chicks and the price of feed. Calculating your return on investment is a good idea when raising chickens for meat, so let's crunch some numbers. These figures are for colored hybrids only; you'll have to make adjustments for white hybrids or heritage poultry breeds.

A quick survey of hatcheries reveals an average price of $60 for 25 straight-run (unsexed) colored hybrid broilers. (*Editor's Note: These figures were accurate when the article was written in 2015.*) Add $25 for overnight shipping, and the cost of 25 chicks will be about $85. (If you raise a heritage breed, you can save money by hatching your own chicks with broody hens. Learn how at *www.MotherEarthNews.com/Broody-Hens*.)

If you raise your birds to 6 pounds live weight—adding 10% for spillage and other waste—you can expect to use about 500 pounds of feed. The cost of feed can run anywhere from about 35 cents per pound at the farm store to 75 cents for organic brands (plus shipping, if you order online), so your feed cost can range from about $175 to $375 or more.

If you free range your colored hybrids, you'll need at least six bales of shavings for bedding in their shelter. At about $5 per bale, that comes to $30.

Figuring an average edible portion of 70% of live weight, and deducting 5% for the typical losses to predators, accidents, and so forth (expect to lose about five broilers for every 100 you raise), you should end up with about 100 pounds of chicken meat.

Assuming you do your own butchering rather than pay a custom slaughterhouse (a how-to video on butchering poultry is listed under "Resources"), raising colored hybrid meat chickens on common farm-store feed will cost you approximately $3 per pound, while raising the same broilers on organic poultry feed might run you $5 or more per pound. Homegrown chicken meat usually costs more than the cheap, industrial chicken sold in supermarkets. The extra cost means you can feed your family more nutritious, delicious, and humanely raised meat.

RESOURCES

FIND SUPPLIES

Directory of Organic Poultry Feed Suppliers *www.MotherEarthNews.com/Feed-Directory*

Directory of Hatcheries and Poultry Breeders *www.MotherEarthNews.com/Heritage-Breeders*

GET ADVICE

American Pastured Poultry Producers Association: *www.APPPA.org*

Growing Small Farms: *www.MotherEarthNews.com/Pastured-Poultry*

WATCH VIDEO TUTORIALS

Chicken Butchering: *www.MotherEarthNews.com/Processing-Video*

START THE EVISCERATION
AT THE SKIN WHERE NECK
JOINS BREAST

TOP: STUART SUTTON; PAGE 86: JASON HOUSTON

Dog Kennel Chicken Tractor

This mobile pen is easy to assemble and move, and sturdy enough to protect your flock.

Article and photos by Thomas Ruth

When foxes began decimating our flock, I was forced to find safer mobile housing for our chickens. I haven't been satisfied with the flimsy nature of many commercial chicken pens and tractors, especially since our flock shares a pasture with goats that love to destroy chicken wire. So, I decided to make my own chicken tractor out of a dog kennel, one that's light enough to easily relocate yet sturdy enough to withstand our goats.

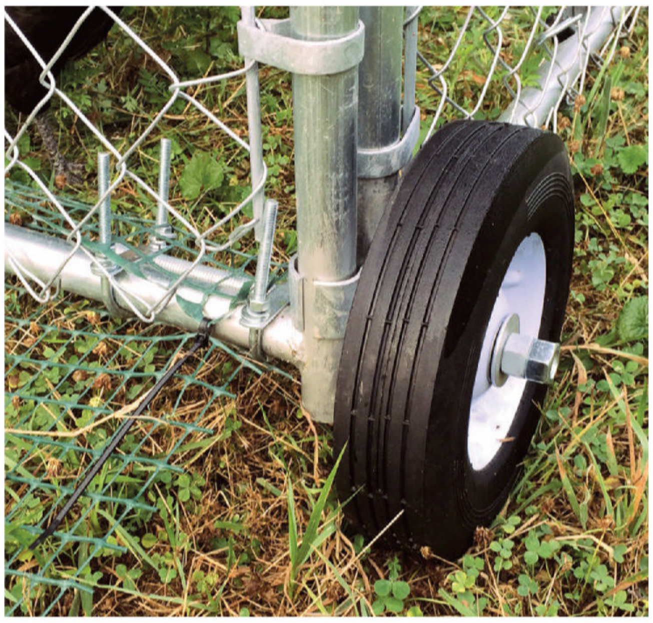
The design I came up with holds a half-dozen chickens. One person can easily move it to a clean section of pasture every few days. I also mounted a hitch on one side to pull it with a lawn mower or tractor. In winter, I use it as an outdoor run by positioning it against our barn with an opening cut through the chain link to allow the flock to enter the barn roost through a cubbyhole.

In all, the materials, which are readily available at farm supply and hardware stores, cost about $500. The dog run was easy to assemble. I chose to use the optional tarp roof for sun protection. I mounted the threaded rods on all four corners using U-bolts, and attached the wheels using nuts and washers. To offer the birds some additional protection from the elements, I used tarp straps to attach the tarps along the windward and sunny sides. To construct a roost and removable ladder, I used salvaged 1-by-1-inch deck railing slats. For nest boxes, I used 5-gallon buckets. I suspended the feeders and water from a 2x4 that runs across the top of the pen.

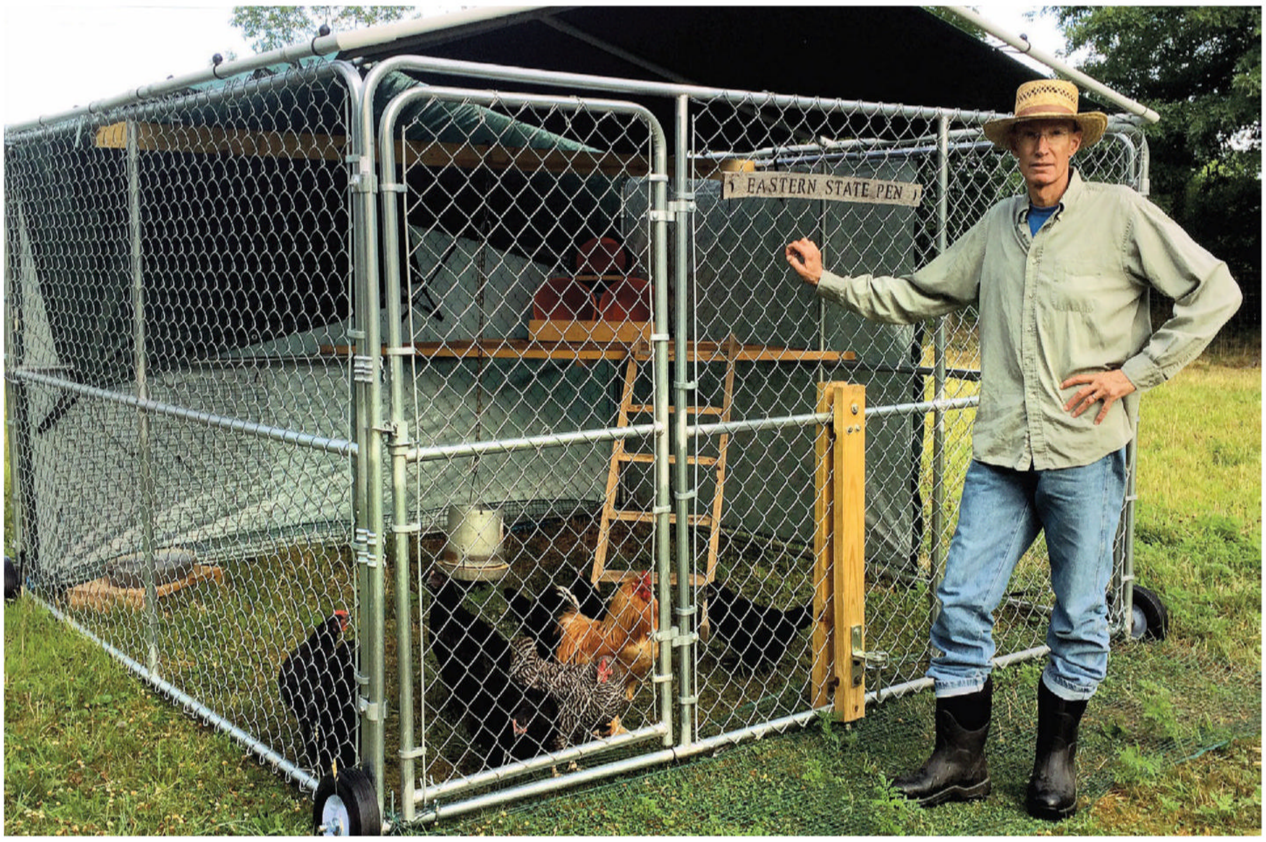
Materials

- 10-by-10-foot chain-link dog run with optional tarp roof
- ⅝-by-24-inch threaded rod with nut and washer (4)
- 10-inch solid lawn mower wheel with ⅝-inch center axle (4)
- U-bolt (8)
- Tarp (2)
- Rubber tarp straps
- Salvaged lumber for roost and ladder
- 5-gallon buckets for nest boxes

The chicken tractor is light enough to be moved by one person.



To mobilize the pen, the author attached lawn mower wheels to the four corners.



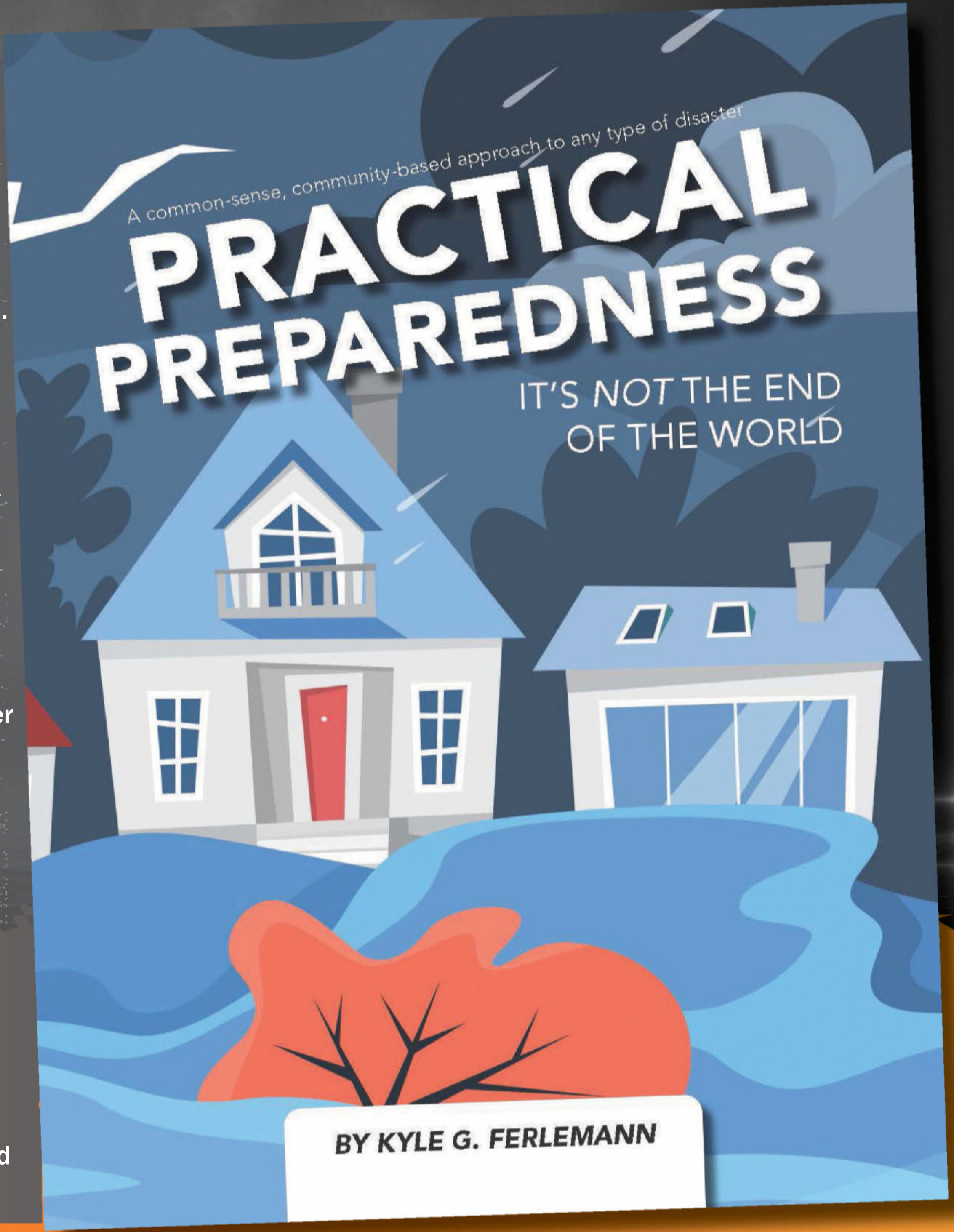
A 10-by-10-foot chain-link dog run is the perfect size to comfortably house six chickens.

A COMMON-SENSE, Community-Based Approach to ANY TYPE OF DISASTER

Disasters overwhelm our surroundings, and challenge our mental, emotional, and physical capabilities. Often the fear and uncertainty seem impossible to overcome, and those feelings escalate when our families are involved. How might those feelings change if the emergency involved more than your immediate family? Would it make a difference if you weren't alone?

Community preparedness is at the core of author Kyle Ferlemann's summary of myriad lessons learned over decades of studying, interviewing, and living through any number of natural disasters and geopolitical conflicts. *Practical Preparedness* focuses on what we can do before disaster strikes, listing the steps to take so you and your family will have the best chance of surviving any type of event during any season of the year.

If we respect nature, add knowledge to our toolboxes, and reach out to others in our communities, your chances for survival greatly increases. It comes down to making personal choices that offer the best opportunities to survive, and even thrive, during a downturn of fortune, whether caused by nature's fury, an armed conflict, or a worldwide pandemic.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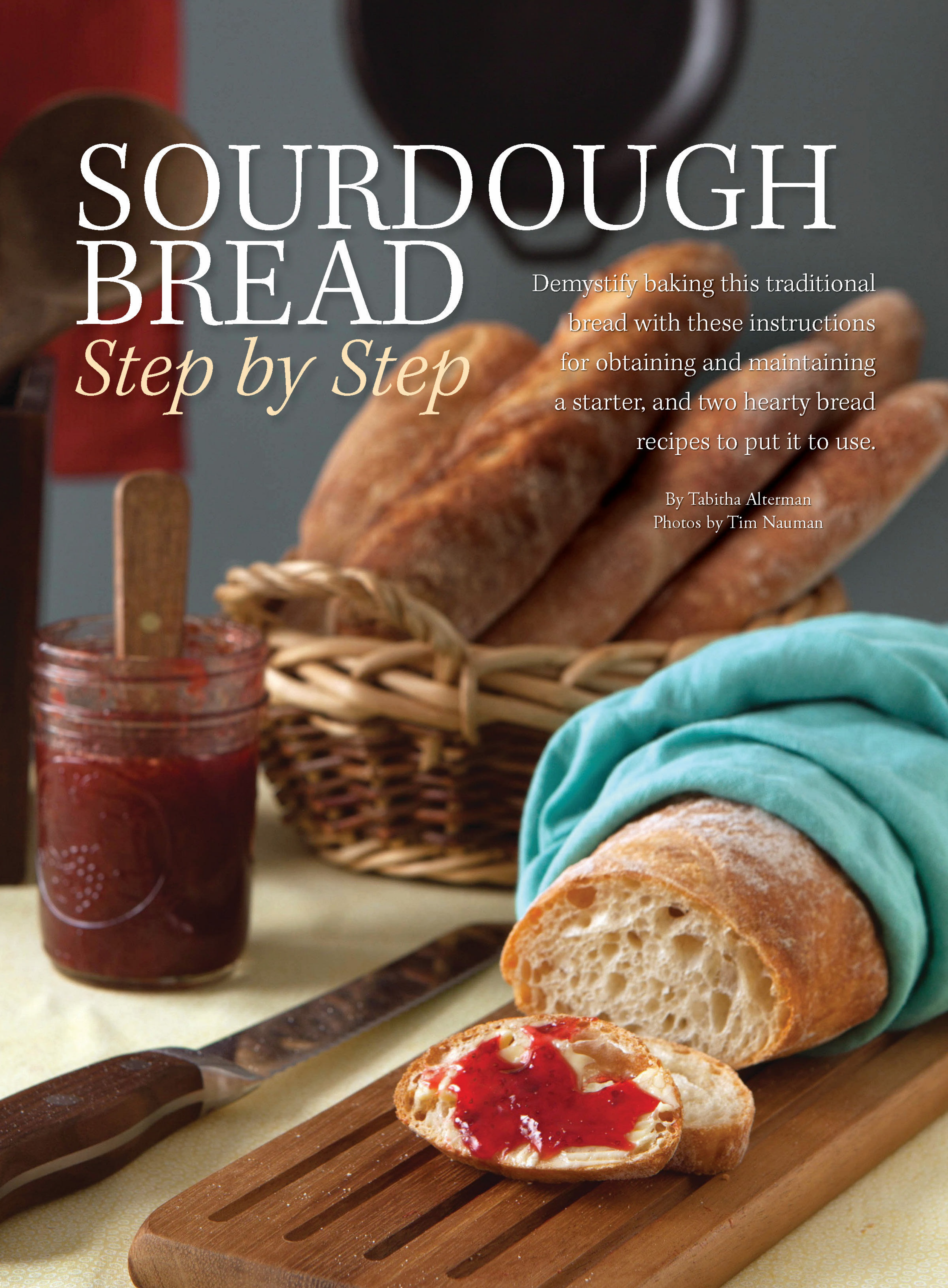


SOURDOUGH BREAD
Step by Step

Demystify baking this traditional bread with these instructions for obtaining and maintaining a starter, and two hearty bread recipes to put it to use.

By Tabitha Alterman
Photos by Tim Nauman

Sourdough is the original way to leaven bread, and evidence of the use of the leavener dates to 1500 B.C., when the Egyptians used blends of wild yeasts and lactobacilli to make both beer and bread.

When flour mixes with water, starches convert to sugars in an enzymatic reaction. The lactobacilli change sugars to lactic and acetic acids, souring the dough. As the dough becomes more acidic, the yeasts that tolerate acid begin to convert sugars into carbon dioxide and ethanol. The carbon dioxide makes sourdough's characteristic holes, and the ethanol evaporates.

Here, we'll show you how to work with starters, and give you two recipes to use them.

Sourdough Schedule

Because they are living entities, sourdough starters need care, and this may be where their reputation for being finicky comes from. Actually, caring for sourdough starters is easy: They just need regular feedings of flour and water.

Following sourdough bread recipes requires steps spanning more than one day, but these steps aren't complicated.

One way to make sourdough bread recipes work with your schedule is to bake the bread when you have time and eat it later. Homemade sourdough bread stays fresh longer than other breads — up to a week — and baked sourdough loaves also freeze well.

Amber Eisler, an instructor at the King Arthur Flour Baking Education Center in Vermont, says personifying helps you tend your sourdough. "Sourdough likes to be at a comfy temperature. It likes to be fed regularly. It requires food, water, and oxygen, plus time to digest its meals. Think of it like a pet to make your life easier and sourdough bread less mysterious."

Sourdough loaves stay fresh longer than other breads.

FOTOLIA/JODIE JOHNSON

Start with a Starter

Order fresh or dried starters (which come with activation instructions) from companies such as Sourdoughs International (*www.Sourdo.com*). Usually the instructions tell you to feed the starter several times over a couple of days in the beginning to bring it up to baking potential.

You can also get a sourdough starter from a friend or generous baker. Most often, the baker will discard some of the original starter at each feeding. Use this discarded, "unfed" starter to make flavorful pancakes, bagels, and other baked goods, or feed it to turn it into a new starter.

Store your starter in a nonreactive container with an opening wide enough to allow you to stir the starter. A ceramic crock or glass jar works well. Cover loosely, and make sure the lid is not airtight — cheesecloth secured with a rubber band will do the trick.

Some starters reportedly work best with only refined flour or only whole-grain flour. Through experimentation, you can discover which your starter likes. Monica Spiller, a sourdough baker of more than 30 years and the founder of *www.WholeGrainConnection.org*, recommends using exclusively stone-ground, 100% whole-wheat flour for sourdough. But other bakers, including Eric Rusch of Breadtopia (*www.Breadtopia.com*), say refined white flour makes a more predictable starter, even if you use it in whole-grain doughs.

Whole-grain starters tend to be more needy because they are more active. The enzymes in the outer layers and the germ of the wheat seed are not present in white flour. These enzymes contribute to more active and faster fermentation.

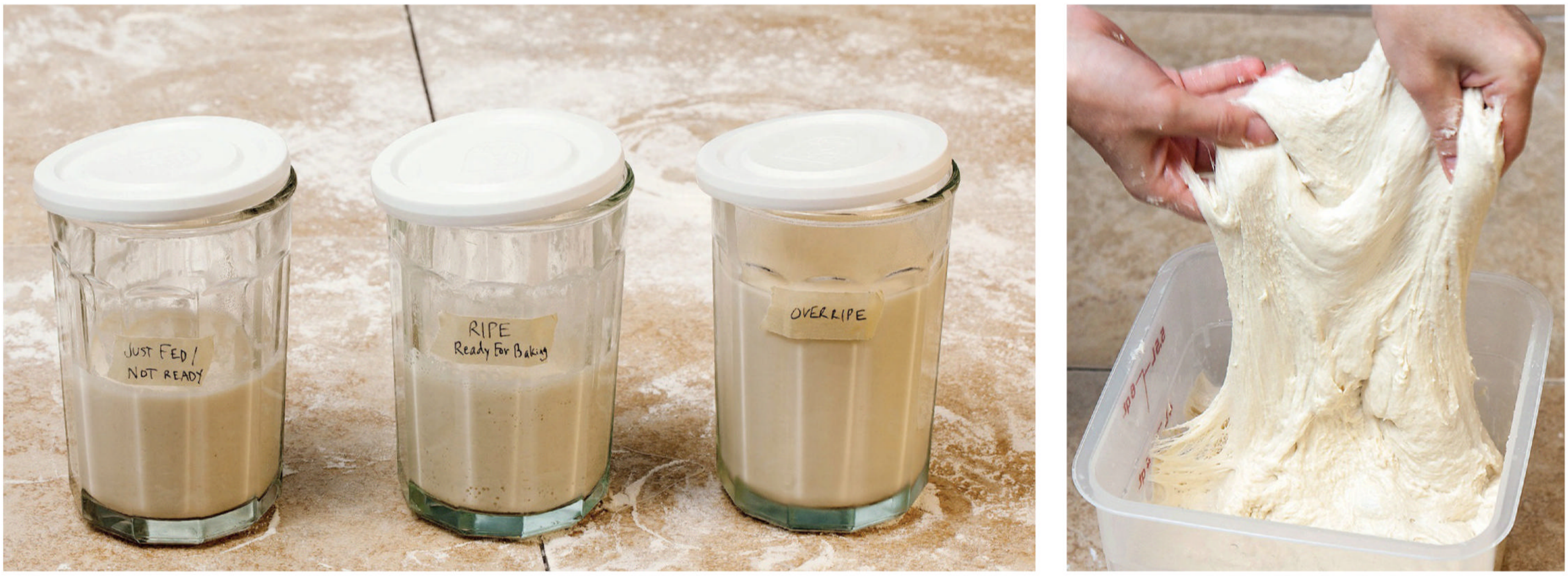
If you have a neglected sourdough starter, try to revive it with small feedings of flour and water before giving up.

Maintain the Starter

You can maintain a stiff starter that has a consistency similar to bread dough, or one that's wetter. Here are some sample starter-maintenance methods, all of which can be adjusted according to the recipe you use on baking day.

If you plan on making sourdough bread three times per week or more: Maintain your starter at room temperature. In this case, experts at King Arthur Flour recommend feeding the starter daily. First, remove all but 4 ounces. To this, add 4 ounces each of water and flour (that's about a cup of flour and a half-cup of water), mix until smooth and cover loosely. The day before baking, feed it twice without removing any starter. Let a minimum of six hours elapse between feedings. The last feeding should be 6 to 8 hours before you mix your bread dough.

If you plan on making sourdough bread just once or twice per week: Keep your starter in the refrigerator. For example, if you plan to bake on Saturday, remove the starter from the refrigerator on Thursday morning. Set aside all but 4 ounces, and feed that with 4 ounces each of flour and water. Stir them in until mixed well, and cover loosely. Feed again on Friday morning, Friday night, and Saturday morning, adding enough flour and water to build the starter up to the volume your



An unfed starter may have a few bubbles, but a ripe starter will be quite bubbly (left). You can fold dough over on itself instead of kneading (right).

recipe requires, plus a little extra (at least 1 ounce) to keep your starter going. When you remove the amount of starter called for in your recipe, feed whatever is left behind by stirring in 4 ounces each of flour and water, and let the mixture ripen (optimal leavening power) at room temperature before putting it back into the refrigerator.

If you will not bake at all during the week: Store your starter in the refrigerator and feed it once. Remove it from the refrigerator, feed it, and let it ripen before returning it to the refrigerator.

If you will not bake for a long time: Be sure to feed your starter occasionally—at least once a month—to keep the population of yeast and bacteria healthy, and store the starter in your refrigerator. You can dehydrate starter, too—find an instructional video on how to dehydrate a starter online at *www.MotherEarthNews.com/Drying-Starter*.

‘Ripe’ for Baking

A sourdough starter that is ready for baking is referred to as “fed” or “ripe.” In recipes, it may be called “leaven.” Chad Robertson, author of *Tartine Bread*, says sourdough starter is ready when it will float in room-temperature water. Eisler of King Arthur Flour suggests also looking for small bubbles all over and on top of the starter. Storing the starter in a glass jar will help you see the sides. Some crevices also may have formed on top, which indicate that the mixture has reached its maximum volume and is beginning to sink. It should be aromatic, with a sour-fruity smell, but not too vinegary. It may look foamy in places. A stiffer starter will dome and begin to fall.

You should ideally use the starter to mix dough within about two hours of this ripe stage. If the starter has reached the point of smelling powerfully like vinegar and has fallen quite a bit, you should feed it again and let it ripen fully before baking.

The last feeding before you’ll use the sourdough starter is

Rustic Sourdough Bread Recipe

Yield: One 1½-pound sourdough boule.

1 cup leaven, or fed sourdough starter
2 cups lukewarm water
5 cups flour, plus up to 1 cup more for the work surface
1½ teaspoons salt

1. Feed your starter by setting aside half of it and feeding the remainder with 4 ounces of flour and 4 ounces of lukewarm water. Stir to combine, and set the starter aside for 8 to 12 hours to complete the culture proof before you use it to bake.

2. In a mixing bowl, pour 1 cup fed sourdough starter into 1 cup lukewarm water. Add 3 cups flour, a little at a time. Stir until loosely combined, then mix thoroughly with wet hands. Cover the container loosely and set aside for a half-hour if using white flour, or 45 minutes for whole-grain flour.

Feed the set-aside starter with 4 ounces each of flour and lukewarm water. Stir to combine, cover loosely, and leave at room temperature until it becomes fully active. This is your new starter to maintain and use.

3. After the dough’s autolyse period (about 30 minutes for white flour, and as much as 45 for whole-grain flour), sprinkle the salt over the dough and mix it in using your hands. If the dough feels dry, add a little more water—it should be somewhat sticky. Turn the dough out onto a floured board and knead it for a couple of minutes, until it no longer picks up any new flour. Return it to the container, cover loosely and leave at room temperature to undergo bulk fermentation.

4. Bulk fermentation usually lasts 3 to 4 hours. During the

Left to right: The dough may not double in bulk during rising. Shape the dough into a loaf, then slash the loaf to give room to expand during baking.

referred to in some recipes as the "culture proof." Don't confuse this step with the "dough proof" that follows it, or the "loaf proof" that happens just before baking. Take care to read recipes thoroughly so you don't get the steps mixed up.

Mix the Dough

Many recipes instruct you to mix the dough and knead it for up to a half-hour before the next step. The reason is that kneading the dough helps develop the rubber band-like strands of gluten (one of wheat's proteins) that give dough its elasticity and help capture the gasses released by the yeasts as they consume the dough's sugars.

Some recipes employ the "autolyse" (pronounced AUT'-o-leez) method, in which you mix up all of the ingredients except salt and let them rest for about a half-hour (or a little longer for whole-grain doughs). Then mix in the salt and either knead for just a few minutes or, if following a no-knead recipe, move on to the next step.

When making a no-knead bread recipe, the most manipulating you'll be required to do is picking up the dough every half-hour or so during the initial rise and stretching and folding it over onto itself to help strengthen the gluten. Breadtopia's Rusch substitutes a quarter-cup of ripe sourdough culture for the yeast in a basic no-knead recipe (such as the one on our website at *www.MotherEarthNews.com/No-Knead-Bread*).

Ferment the Dough

This step is referred to as "dough proof" or "bulk fermentation." In many recipes, you leave the dough alone to rise for anywhere between 2 and 12 hours. Some recipes also instruct you to press down the dough, fold it over onto itself or punch it down.

If sourdough ferments in

Remember: Cooling the loaf after baking is important to the bread's final quality.

first couple of hours, gently stretch and fold the dough about every half-hour, pulling one edge at a time up and over the center, until all sides have been stretched. After the first few times, be extra gentle, and take care to keep the built-up gases inside the dough.

5. Turn the dough out onto a floured board and let it rest for 10 to 20 minutes. If it seems very strong and cohesive at this point, take care not to overwork it when shaping the dough. If it seems slack and tears as you stretch, you may want to give it extra stretching folds before the final shaping. If it is extremely slack, incorporate more flour as you fold and shape, although ideally you would not incorporate any more flour at this point.

6. Pat the dough lightly into a rectangle. Pick up each side one at a time, gently stretch it out, and fold it back over the dough's center, until all four sides have been stretched. Leave the dough alone for a minute so it can relax.

7. Roll the dough into a ball, or "boule." Pull gently but tightly to ensure that the top is taut all the way around. One way to do this is to put the ball on an unfloured surface and begin spinning it gently. The bottom will grab the work surface and create tension as you rotate the ball. Another way is to grab and gently pull four "corners" to the bottom and pinch them together.

8. Let the shaped dough rise for its final proof, right-side-up, on a floured baker's peel. You can improvise a baker's peel by flouring the back of a cookie sheet. Or, let the dough rise upside down in a floured proofing basket, or "banneton," which will help it keep its structure. You can improvise one by lining a mixing bowl with a floured cotton towel.

The dough should proof 2 to 4 hours at room temperature. Dust a bit of flour on the surface, and cover it with a kitchen towel to keep a crust from forming.

9. Preheat the oven to 500 degrees Fahrenheit about 30 minutes before baking, with a Dutch oven, cloche, or enclosed pan in the oven.

After 30 minutes, carefully remove the lid, and use the baker's peel to shuttle the loaf into the pan (or turn the loaf upside down from the proofing basket or bowl into the pan).

Replace the lid, turn the oven down to 450 degrees, and bake the bread for 20 minutes. Then, remove the lid and allow the loaf to bake for 20 to 25 minutes more, uncovered, for good browning.

10. Remove the finished bread to a cooling rack. Let the loaf cool for at least 1 hour. Proper cooling is important to keep moisture from escaping and for the bread's final crust to develop.

Use a cloth “couche” to support several baguettes as they rise.

a cool environment, it will be mildly sour, but this may also result in limited rise and longer fermentation. Warm environments speed rising time and lead to a higher rise and more acid development (and acid tang).

These variables of time and temperature give you tremendous control over your finished bread.

Shape a Loaf

Your dough should be pillowy for the “final proof.” It may not have doubled in bulk, but look for lightness in the dough. You may be able to feel air pockets. Try to catch the dough when it’s filled with the maximum level of gasses but before it begins to collapse.

If you have time, turn the dough out of your container onto a floured board and let it rest before shaping it into a loaf for its final proof with either of these recipes.

Into the Oven

Bake your bread in an enclosed, humid environment to create a crisp, crackling crust. Preheated Dutch ovens are perfect for making sourdough bread, but it’s difficult to slash the loaves after the dough is inside the pot. The design of the bread cloche made by Emile Henry (at *www.EmileHenryUSA.com*) and both the cast-iron combo cooker (seen on Page 92) and double Dutch oven made by Lodge (at *www.LodgeCastIron.com*) solve this problem.

When ready to bake, slash the loaves to provide a place for the dough to expand during baking. The pattern, angle, and depth of the cuts will affect how the bread expands during baking. Some patterns of cuts are traditionally used to identify the type of bread.

You can also bake the bread for about 40 minutes in an uncovered pan or on a baking stone in an oven preheated to 450 degrees Fahrenheit. Or put the bread in a cold oven, turn the oven to 375 degrees, and bake the bread for 70 minutes. Add steam to the oven during baking for good rise and a crisp crust. You can set a pan of ice cubes on a different rack, or mist the oven walls with water before closing the door.

To determine whether your bread is done, the thump test is still the best. If you like to rely on temperature, make sure sourdoughs have hit at least 200 degrees internally. King Arthur’s Eisler likes to squeeze the crust. If it yields to the pressure, it isn’t done. It should be firm until the bread cools down.

No-Knead Sourdough Bread Recipe

This is a “San Francisco-style” sourdough bread recipe, with a crackly crust and a chewy texture. *Yield: 1 loaf.*

3½ cups all-purpose flour
¼ teaspoon active dry yeast
1¾ teaspoons salt
⅔ cup sourdough starter
1½ cups water
Coarse cornmeal, for dusting

Combine flour, yeast, and salt in large mixing bowl and whisk together. Combine sourdough starter and water in large mixing cup and add to flour mixture. Mix with rubber spatula until you have a thoroughly combined, wet, sticky mass of dough. Cover bowl with plastic wrap and let sit at room temperature for 12 to 18 hours.

After at least 12 hours have passed, your dough should be dotted with bubbles and should have more than doubled in size. Dust a wooden cutting board with flour. Turn out dough onto board in one piece. The dough will be loose and sticky, but do not knead in more flour.

Dust the top of the dough lightly with flour and cover with clean cotton or linen tea towel. Let dough rise an additional 1 to 2 hours. About 30 minutes before second rise is complete, place a 3½-quart cast-iron Dutch oven (oval-shaped gives best results) on rack positioned in middle of oven. Heat oven to 450 degrees Fahrenheit. When the oven has preheated, remove pot and sprinkle about 1 teaspoon coarse cornmeal evenly over bottom. Uncover dough and, using two plastic dough scrapers, shape dough into a ball by folding it over onto itself a few times. With scrapers, lift dough carefully and let it fall into heated pot by slowly separating scrapers. Dust top of dough with coarse cornmeal. Cover pot and bake for 35 minutes.

Remove cover from pot, rotate base, and continue baking for an additional 15 minutes, or until loaf is nicely browned. Remove pot from oven. With sturdy spatula, pry loaf from pot and transfer to cooling rack. Allow bread to cool for 1 hour before slicing.

—Karen Keb Will

KAREN KEB WILL

ADDITIONAL RESOURCES

Online Gardening Tools

www.MotherEarthNews.com/ Crops-At-A-Glance

A guide on the specifics of 51 garden favorites, with recommended varieties.

www.MotherEarthNews.com/ Find-Seeds-Plants

A custom search tool to help you find sources for veggie and fruit varieties you want to grow.

www.MotherEarthNews.com/ Garden-Planner

Grow even more food by using this smart, efficient garden-planning tool.

www.MotherEarthNews.com/ Organic-Gardening

Links to featured organic gardening articles, blogs, Ask Our Experts entries, and the Organic Gardening Archive.

www.MotherEarthNews.com/ Organic-Gardening-Products

A custom search tool to help you easily find gardening products and advice about organic pest control methods.

www.MotherEarthNews.com/ Pest-Control-Series

Resources for pest identification and organic control methods.

www.MotherEarthNews.com/ What-To-Plant-Now

Create a customized planting calendar based on your ZIP code to access planting dates for 30 common garden crops.

Garden Supplies

Arbico Organics
800-827-2847
www.Arbico-Organics.com
Find information about and products for natural pest prevention and control.

The Garden Patch
800-519-1955
www.AGardenPatch.com
Offers self-feeding and self-watering containers.

Johnny's Selected Seeds
877-564-6697
www.JohnnySeeds.com
Reliable source for seeds, including many organic and hybrid varieties.

Lee Valley Tools
800-267-8767
www.LeeValley.com
Offers a wide variety of high-quality gardening and woodworking tools.

Peaceful Valley Farm and Garden Supply
888-784-1722
www.GrowOrganic.com
A great source for organic gardening and farming products and information.

Livestock and Poultry

www.MotherEarthNews.com/Homesteading-and-Livestock/Poultry/Raising-Chickens/

Links to featured articles.

Department of Animal Science, Oklahoma State University
www.AnSi.OKState.edu/breeds
Maintains an index of poultry and livestock breeds with photos and illustrations.

Eatwild
www.Eatwild.com
Information on—and sources for—pastured meat and eggs.

The Livestock Conservancy
www.LivestockConservancy.org
Lists breeds of heritage livestock and poultry in need of preservation.

The Modern Homestead
www.TheModernHomestead.us
Offers tips for self-reliant living, with detailed advice on raising and breeding poultry.

Farming

National Sustainable Agriculture Information Service (ATTRA)
www.ATTRA.org
Offers the latest information on sustainable agriculture and organic farming, including news, events, and funding opportunities.

Sustainable Agriculture Research and Education (SARE)
www.SARE.org
A trustworthy source of information on sustainable farming practices.

Save on Food

Local Harvest
www.LocalHarvest.org
An excellent, comprehensive directory to help you find local food and farmers.

National Center for Home Food Preservation
www.NCHFP.UGA.edu
Offers current research-based recommendations for food preservation methods and addresses food-safety concerns.

National Co-op Directory
www.NationalCo-opDirectory.com
Offers information on food cooperatives and provides an online directory for natural food co-ops and distributors across the United States.

United Natural Foods
www.UNFI.com
Provides information on natural-food buying clubs and how to join one.

Energy Efficiency and Green Building

American Council for an Energy-Efficient Economy
www.ACEEE.org
Promotes energy efficiency by performing research and providing information about smarter energy use.

BuildingGreen
www.BuildingGreen.com
Member-supported site that provides excellent information on green building.

Energy Star
www.EnergyStar.gov
Information on energy-efficient appliances, retrofitting homes for increased efficiency, and building new homes that use less energy.

Home Energy Saver
www.HomeEnergySaver.LBL.gov
A DIY energy audit tool that shows how you can save money by investing in energy-efficient appliances and retrofits.

Office of Energy Efficiency & Renewable Energy
www.Energy.gov
This U.S. Department of Energy website offers tips to help users conserve energy and save money.

ZIP Code Insulation Program
www.MotherEarthNews.com/Insulation-Program
Free, Web-based computer program that calculates the amount of insulation appropriate for your house.

Solar Energy and Heating

American Solar Energy Society
www.ASES.org
Nonprofit organization promoting energy efficiency and the use of solar energy in the United States.

Build It Solar
www.BuildItSolar.com
Excellent collection of advice and solar energy projects for do-it-yourselfers.

Database of State Incentives for Renewables & Efficiency
www.DSIREUSA.org
Information on federal, state, and local incentives that promote renewable energy and energy efficiency.

National Renewable Energy Laboratory Resource Maps
www.NREL.gov/gis/solar.html
Regional, month-by-month maps of solar radiation and the potential for solar power.

North American Board of Certified Energy Practitioners
www.NABCEP.org
Lists certified solar installers by state.

Renewable Energy Project Development Resource Directory
www.EPA.gov/Green-Power-Markets
Project development resources for renewable energy systems.

RMI
www.RMI.org
An independent, nonprofit organization that promotes renewable energy.

Recommended Books

Order these great books online and find others on similar topics at *Store.MotherEarthNews.com.*

The All-New Ball Book of Canning and Preserving
Experts in the field of food preservation create a comprehensive guide for home cooks; includes more than 200 new recipes.

The Beginner's Guide to Living Off the Grid
by Gary Collins
To discover if a life off the grid is for you, read this workbook, the companion piece to the author's *Living Off the Grid: What to Expect While Living Life of Ultimate Freedom and Tranquility*.

The Dehydrator Bible
by Jennifer MacKenzie, Jay Nutt, & Don Mercer
Use this effective and low-cost method for preserving food to know exactly what goes into your food.

The Encyclopedia of Country Living: 50th Anniversary Edition
by Carla Emery
Grab a copy of this landmark book to learn more about living off the land and doing it all yourself.

How to Build an Underground House
by Malcolm Wells
From concept basics to house plans, Wells covers the topic of underground architecture and helps you decide if such a dwelling is right for you.

Install Your Own Solar Panels
by Joseph Burdick & Philip Schmidt
Design and install your own photovoltaic system with advice from a veteran solar panel installer and a seasoned builder.

Mixes in a Jar
by Renee Pottle
The ultimate convenience foods made easy by an experienced cook and innovator.

Mother Earth News Guide to Vegetable Gardening
This collection of articles offers advice on planning a kitchen garden, finding the right plants for your area, and getting your hands dirty.

Practical Preparedness
by Kyle Ferlemann
What would you do during a natural (or not-so-natural) disaster? Discover the steps to take to protect your family, your property, and yourself.

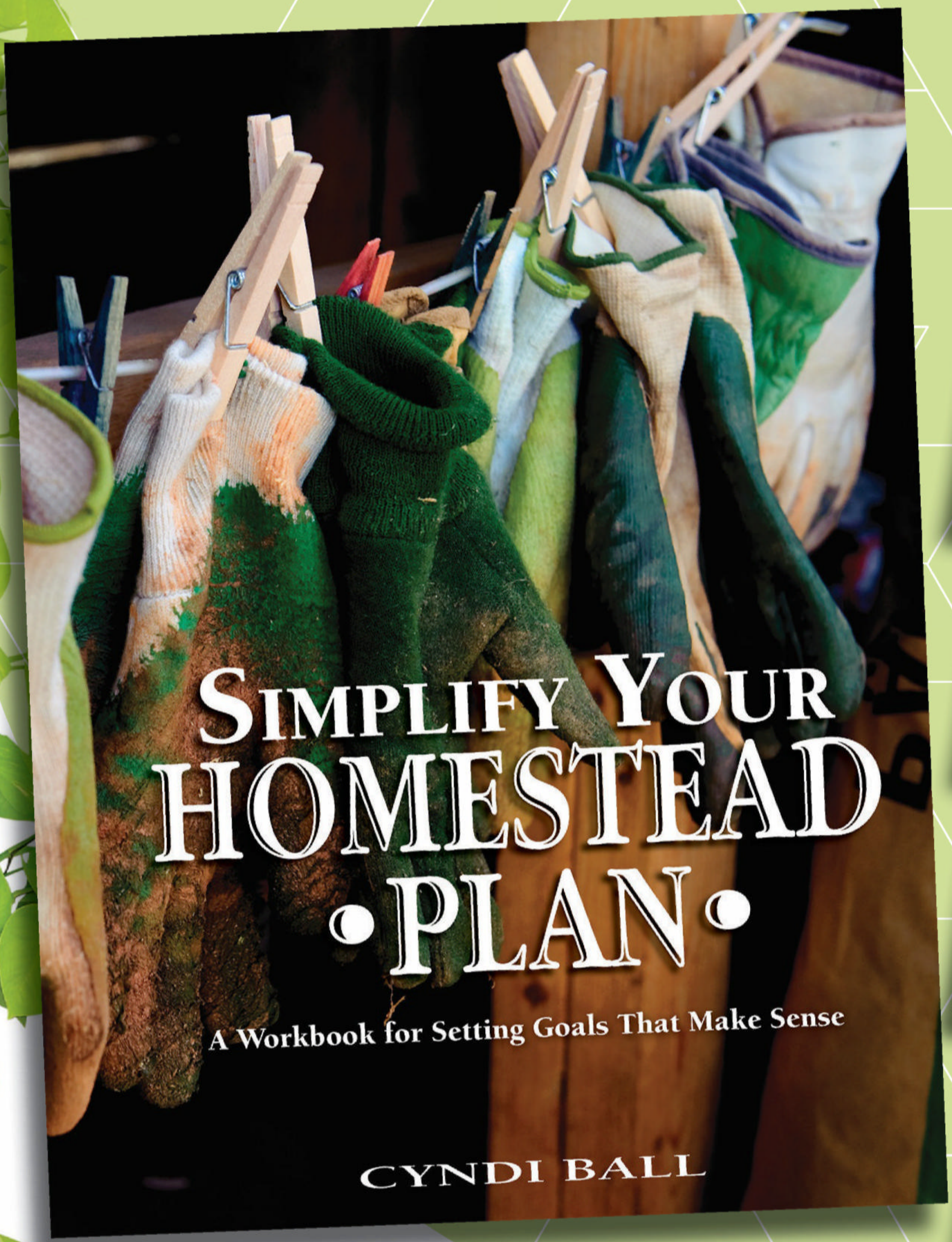
Raise Backyard Bees
From Mother Earth News
From hives to honey, learn all about our busy, buzzy, and friendly pollinators.

Raise Backyard Chickens
from Mother Earth News
So you want to be a chicken keeper? Learn all you need to know in this comprehensive collection of articles.

Root Cellaring
by Mike Bubel and Nancy Bubel
Step-by-step advice provides you with the knowledge to use natural cold storage to preserve your fruits and vegetables.

The Self-Sufficient Backyard
by Ron and Johanna Melchiore
Are you daydreaming about a self-reliant life? Look no further; this book offers tips and advice from a couple of modern-day pioneers.

Simplify Your Homestead Plan
by Cyndi Ball
Learn from an experienced homesteader as she tells her story, lists her accomplishments, and details the lessons learned.



CHAPTER 1

WHY HOMESTEAD?

WORKSHEETS

Sustainable Circle System Practice Page

HERB GARDEN

CHAPTER 2

Figuring Out the DETAILS

How Much Money Will You Invest?

A Workbook for Setting Goals that Make Sense

A homestead has a lot of moving parts with all kinds of projects happening at once. In *Simplify Your Homestead Plan*, Cyndi Ball walks readers through the ins and outs of a homestead lifestyle and what it takes to achieve it. Plus, worksheets throughout the book help guide the process of planning a homestead before fully diving in. With this workbook, you'll be able to avoid the pitfalls of haphazard homesteading and gain methods you need to bring your self-reliant dreams to fruition.

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Page 44

AS OUR LIVES BECOME MORE COMPLICATED, MANY OF US LOOK FOR WAYS TO RETURN TO A SIMPLER TIME.

We yearn for a simple and good life as we dream of self-sufficiency, a more certain food supply, and a more minimalistic approach to today's world. Turn the page to discover 23 articles on living on less: Cut your food bill (Page 4), grow more food (Page 22), buy food in bulk and save (Page 34), build a debt-free home (Page 44), and raise chickens for meat (Page 82).

A collaboration between Mother Earth News and Dotdash Meredith, *Living on Less* offers a number of ways to uncomplicate our everyday lives!

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Page 90